American Aviation

MARCH 28, 1955

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Here is a handful of ELASTIC STOP® nuts. Each has ESNA's familiar red locking collar . . . is self-locking and vibration-proof. Each is a readily assembled, one-piece unit. Each provides positive protection against thread corrosion . . . prevents liquid seepage along bolts. Each is made from the finest of raw materials. Each is exactly controlled as to finished dimensions, class of thread fit and finish. Each is now in use on critical applications, with a record for uniform high quality that is unmatched.

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OTHER PUBLICATIONS AND SERVICES

American Aviation Daily: Daily news service for the entire industry. $200 per year. Managing Editor—Keith Saunders.

American Aviation World-Wide Directory: Twice-yearly listing of products, people, and organizations. $7.50 each. Managing Editor—Marion E. Grambow.

Official Airline Guide: Monthly publication of airline schedules and fares. $13.50 per year in USA; $14.00 in Canada; $15.00 elsewhere. Published from 139 N. Clark St., Chicago 2, Ill. Phone: Central 6-5804. Managing Editor—Robert Parrish.

Air Traffic News (Incorporating Air Traffic Digest): Daily rates and tariff news. $175 per year. Managing Editor—Wallace I. Longstreth.

Airports: Weekly newsletter for airport officials, suppliers, and services. Airmailed every Friday. $25 per year. Managing Editor—Lois C. Philmus.

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After two years in 55 Convair 340's . . .

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United enjoys the high capacity and weight savings of the AiResearch supercharger with all the assurance that fire-resistant Skydrol brings.

"We have been using Skydrol in AiResearch superchargers on 55 of our Convair 340's. After checking results of over 2 years of hard commercial service, we are well satisfied with the performance of both Skydrol and supercharger!"

UNITED AIR LINES

In Convair systems, too, United Air Lines uses Skydrol exclusively.

Because hydraulic systems reach into all parts of the plane, carrying fluid under pressures of 3000 psi or more, use of fire-resistant Skydrol eliminates a real hazard. Its excellent lubricity also reduces wear on moving components.

Converting to Skydrol costs less than you think. Your present overhaul practice calls for periodic replacement of many components of the hydraulic system. Replacing them with units suitable for Skydrol costs no more. In all it costs less than $2000 to convert a Convair at overhaul. Ask us for details and engineering help.

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Letters

Impressed with Article

To the Editor:

Just finished reading your "TACAN, The Common System?" article in the February 28 issue of the AMERICAN AVIATION, and am very impressed with the very thorough coverage you have given this very important matter. I also felt that the "Take Off the Wraps" editorial was very appropriate and timely.

E. A. POST
Chairman
Professional Group on Aeronautical & Navigational Electronics
The Institute of Radio Engineers
Denver, Colo.

Missed the Point

To the Editor:

Small Defense Industries Association people raised eyebrows at the Air Force report (AMERICAN AVIATION, Feb. 14) which said small business received 76% of the 1954 AF work "it was capable of handling."

Newsmen and others have been asking us why we are concerned if small companies are getting three quarters of the Air Force business. It seems everybody missed the point that what went to small business was 76% of only about 10% of the total. We are sure the Air Force released accurate figures, but it is too easy to get them confused.

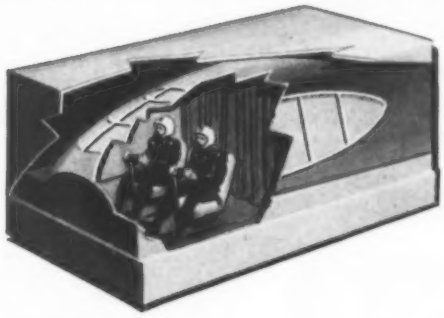
What we should have is a dollar comparison of the purchases from small business in 1954 as against 1953 and then a percentage of what these figures represent out of total Air Force purchases.

Incidentally, your article referred to small business getting a "bigger slice of pie." Our people feel military purchases should not be "pie" for anybody. In fact, we are pushing for new government policies that will take procurement out of the "pie" category.

Here is an example. One of our

SIMULATORS

for the world's leading aircraft



U. S. AIR FORCE B-52 crews can fly the most powerful bomber of the jet age with the electronic SIMULATOR

Gigantic in size, near-sonic in speed, the eight jet Boeing B-52 Stratofortress demands skilled crews. The B-52 Simulator has been specially designed to bring new heights of realism to the polishing of flight techniques, including man-made lightning, the actual feel of flight, and the unique sounds of the B-52 in action.

Built around a detailed replica of the Stratofortress cockpit, this latest Simulator utilizes a complex electronic assembly of almost 500 miles of wire, 1200 vacuum tubes, and close to 300 servos to enable crews – without leaving the ground – to carry America's mightiest weapons anywhere on the globe . . . to master the authentic challenges of high-altitude flight with an oxygen system, complete to masks . . . to navigate, for the first time, through every defiance of weather, even electric storms!

Today, the U. S. Air Force widely recognizes the advantages of Simulators over actual flight itself, and uses them to develop veteran crews for many different types of strategic aircraft.

Only through electronics is such flight reproduction possible. Only Curtiss-Wright with basic patent rights in this field, and its licensees, build Simulators and Duplicators for both the Armed Services and commercial airlines of the world.

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smaller companies develops an item. The military likes it and buys it. One day it says to the small producer that Uncle Sam needs an "alternate source." So the small company turns over its blueprints and gives engineering help to a big outfit which now becomes the alternate supplier. Future orders get split between the two—so the small company loses half its sales. The small company still doesn't complain. Except for one thing. The government pays the larger company a higher price than it pays to the small original producer—then turns around and renegotiates the small company out of most of its profit. Here the smaller company —already saving the government money through a lower price—is penalized for being efficient—so the larger company can be supported by the government for being less efficient.

I haven't mentioned any names because this example is not an isolated case. It has happened many times. The individual small companies to whom this sort of thing has happened are reluctant to have their names used for fear of losing what business they have.

My point is: if there is any "pie" it is not for the small companies who win every dollar of their business by tough competition. And if something constructive is done, it won't be through issuing statistics. What we need is a good look at basic policies on taxes and renegotiation and other things. If the rules provide the basic incentives for government to take advantage of the savings small business offers, nobody will need to urge anybody to buy from us.

GEORGE WING
Director
Small Defense Industries Assn.

Books

Glass Reinforced Plastics *Edited by Phillip Morgan. Published in the U. S. by Philosophical Library, Inc., 15 East 40 St., N. Y. 16, N. Y. 248 pp. $10.00.*

A collection of information on glass plastics, covering the basic chemistry, production techniques, characteristics of structures, and applications in various industries, including aviation. Each of the 15 chapters is written by a different British authority in the field, with the one on aviation authored by Richard Wood, editorial assistant on the staff of *British Plastics.* . . . WK

Wave Diagrams for Nonsteady Flow in Ducts. *By George Rudinger. Published by D. Van Nostrand Co., Inc., 250 Fourth Avenue, New York. 278 pages. Price: $6.*

Rudinger, principal physicist at Cornell Aeronautical Laboratory, divides his work on wave diagrams into 13 chapters dealing with various aspects of wave diagram. The book, in the words of the cover jacket, "provides for the first time a consistent set of computing procedures for their construction, with emphasis on the practical aspects of carrying out the computations." . . . WDP

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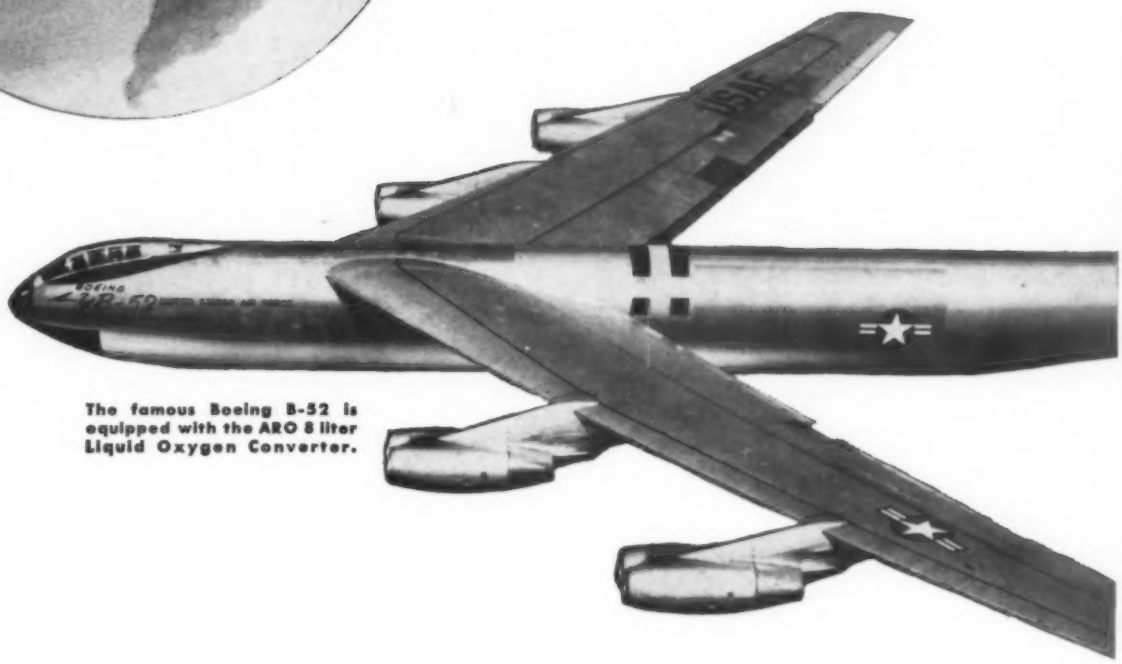

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Up where air is thin . . . ARO Oxygen Equipment performs a vital job . . . safeguarding the lives of airmen.

As planes go higher and higher . . . greater and greater is the need for the many new developments in oxygen equipment pioneered by Aro research. These and many other precision products by Aro are widely used today by the Air Forces and leading aircraft manufacturers. For more details write:

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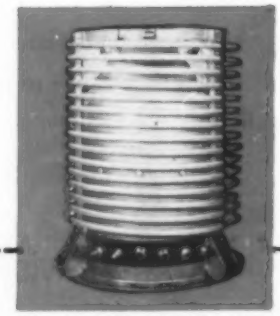

The new 5, 8, and 20 liter ARO Liquid Oxygen Converters save space and weight in fighters and bombers . . . another ARO *first!* Complete technical and engineering data available upon request.

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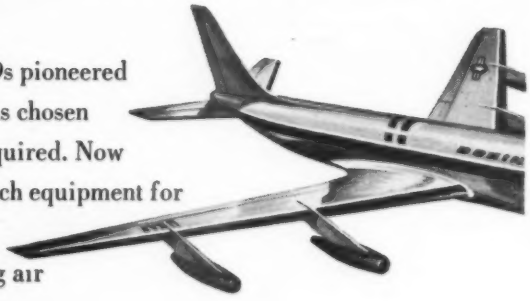
For America's first jet tanker-transport fleet...

AIR CONDITIONING by AiRESEARCH!

Boeing solves cabin comfort problems at new high altitudes and speeds for transports with complete AiResearch systems



History repeats. When Boeing B-29s pioneered heavy bomber flying at high altitudes, AiResearch was chosen to supply the cabin-conditioning equipment required. Now Boeing has again selected AiResearch equipment for its sleek new KC135s.

AiResearch has unmatched experience in developing air conditioning equipment for the majority of present day commercial and military aircraft. It has produced more complete air-conditioning and pressurization systems and components than all other manufacturers put together.

Once more a leading manufacturer confirms that where proved designs, reliability and high performance are required, AiResearch is the choice in its field.

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AiResearch Manufacturing Divisions

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Designers and manufacturers of aircraft components: REFRIGERATION SYSTEMS • PNEUMATIC VALVES AND CONTROLS • TEMPERATURE CONTROLS CABIN AIR COMPRESSORS • TURBINE MOTORS • GAS TURBINE ENGINES • CABIN PRESSURE CONTROLS • HEAT TRANSFER EQUIPMENT • ELECTRO-MECHANICAL EQUIPMENT • ELECTRONIC COMPUTERS AND CONTROLS

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Circle No. 7 on Readers Service Card

ORENDA . . . *a new power in the Jet Age!*

Orenda Engines begins its corporate life with an established record of engineering and production achievement, with management and policies unchanged and with the same goal . . . leadership in the field of aerial propulsion.

From Orenda's design, development and production departments came the first all-Canadian jet engine to power the CF-100 and F-86 Sabres V and VI. Since September, 1952, the company has delivered over 1,500 Orendas. Expanded research facilities are now under construction to deal with the increasingly complex power requirements of the future.

The 6,000 people in the Orenda family are dedicated to designing, manufacturing, maintaining and servicing modern jet engines and other forms of aero power and to the building of a sound aircraft industry for the defence and development of Canada.

*ORENDA: Source of all power—*Iroquois*

ORENDA ENGINES LIMITED
MALTON

DEDICATED TO CANADA'S JETPOWERED LEADERSHIP IN THE AIR

Pulse of the Industry

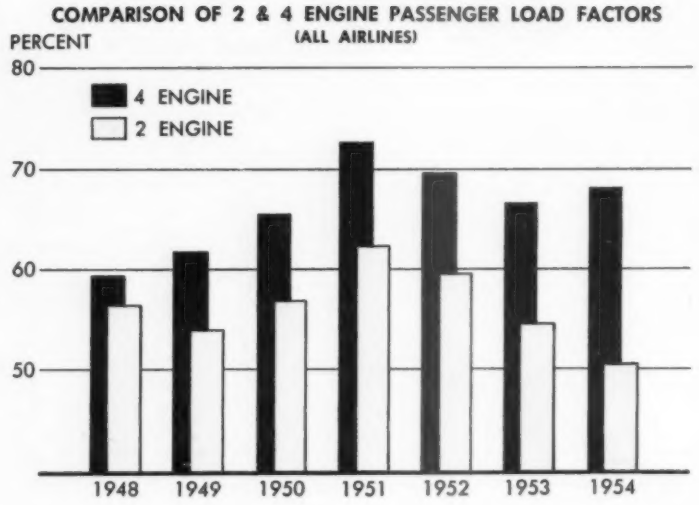
Four-Engine Aircraft Show Best Load Factors

FOUR TIMES as many passenger revenue miles were run up by four-engined aircraft on U. S. domestic routes last year as were run up by twin-engine types. While this is accounted for in large part by the greater number of four-engine transports in operation, a major contributing factor was that the four-engine transports also showed an 18-point advantage in load factor.

How come? Airline authorities come up with several significant reasons why:

1. Four-engine airplanes are purposely scheduled to operate over routes of and at times of greatest traffic potential. The shuttles, "milk runs" and tag end flights are left to twin-engine aircraft.

2. Coach traffic, which has grown rapidly in recent years, is carried on primarily with four-engine types inasmuch as CAB regulations require high-density aircraft for all coach operations, except during off-peak hours.

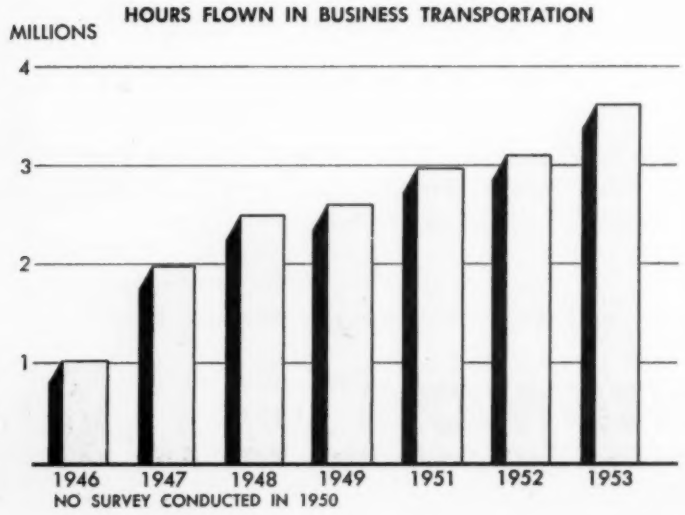


3. The airlines are inclined to feature four-engine equipment more in their promotion. In part, this is a matter of economics, since seat-mile costs of the larger planes usually are less than for smaller types. Thus, if larger planes can be filled, they will yield a more profitable operation.

The Bull Market in Business Flying

THOUGH THE CLOSE of World War II saw a great many predictions about the future of aviation—some of which were right and others wrong—few could have foreseen the rapid growth of business flying.

The butcher, baker and certainly the businessman took to the air—in his own or his company's airplane. Hours flown in this manner jumped from a modest 270,000 in 1942 to a sizeable 1,068,000 in 1946 (no available records for the years between) and to a whopping 3,626,000 by 1953. CAA estimates place total business flying hours for 1954 at 3.9 million, a gain of 8.1 per cent over 1953. Business flying today adds up to over a million hours more than airline operations.



Companies and individuals use airplanes much like automobiles and trucks. A salesman in an airplane can cover a larger territory than he could using only his car. Executives and technicians fly from one company plant to another; merchandise is flown to market, or repair parts to a factory.

Of the aircraft used in business flying about 30 per cent or 10,550 were company-owned in 1953 and accounted for 1,901,000 hours or 52 per cent of business flying time. Individuals owned 69 per cent of the planes (24,290 planes) and accounted for 1,690,000 hours or 48 per cent of the flying time.

When & Where

Mar. 28-Apr. 1—American Society for Metals exposition and congress (including all-day session on aircraft and rocketry sponsored by the American Welding Society), Pan Pacific Auditorium and Ambassador Hotel, Los Angeles.

April 5-7—Radio Technical Commission for Aeronautics Spring Assembly Meeting. Los Angeles.

Apr. 16-20—American Association of Airport Executives annual mtg., El Conquistador Hotel, Tucson, Ariz.

Apr. 18-21—Society of Automotive Engineers Golden Anniversary aeronautic mtg. aeronautic product forum and aircraft engineering display, Hotel Statler and McAlpin Hotel, New York City.

Apr. 18-22—American Society of Mechanical Engineers, 75th anniversary mtg., Baltimore.

Apr. 20-22—American Rocket Society spring mtg., Baltimore.

Apr. 21-23—Airline Ground Transportation Association annual convention, Sheraton Palace Hotel, San Francisco.

Apr. 24-28—Airport Operators Council annual mtg., Hotel Olympic, Seattle.

Apr. 27-30—American Helicopter Society 11th annual forum, Mayflower Hotel, Washington, D. C.

Apr. 29—Institute of Navigation's eastern regional mtg., Friendship International Airport, Baltimore.

Apr. 29-30—New England Radio-Electronics mtg., sponsored by the Institute of Radio Engineers, Sheraton Plaza Hotel, Boston.

May 2-5—Society of Aeronautical Weight Engineers annual national conference Hilton Hotel, Fort Worth.

May 3-5—First International Aircraft Mart Exposition, Will Rogers Memorial Coliseum, Fort Worth, Tex.

May 4-5—Air Traffic Conference spring mtg., Parker House, Boston.

May 4-6—Fourth International Aviation Trade Show, 69th Regiment Armory New York City.

May 5-7—National Intercollegiate Flying Association annual convention and air meet, Meacham Field, Fort Worth, Tex.

May 9-11—Institute of Radio Engineers national conference on aeronautical electronics, Biltmore Hotel, Dayton, O.

May 17-19—Aircraft Industries Association annual board of governors mtg., Williamsburg, Va.

May 18-20—California Association of Airport Executives annual convention, Long Beach, Calif.

May 18-20—National Telemetering Conference, Chicago.

May 31-June 4—Aviation Writers Association annual convention, Montreal and Toronto.

June 12-17—Society of Automotive Engineers summer mtg., Atlantic City.

June 18-25—Third annual Transcontinental Air Cruise, Palm Springs, Calif. to Philadelphia.

INTERNATIONAL

Mar. 31-Apr. 1—Symposium on Boundary Layer Effects in Aerodynamics, National Physical Laboratory, Teddington, England.

Apr. 25-May 6—International Air Transport Association eighth technical conference, San Juan, P. R.

May 2—IATA composite agency committee mtg., Bermuda.

May 30—Fifth International Air Display, Ypenburg, The Netherlands.

May 31—International Civil Aviation Organization Assembly, ninth session, Montreal.

ON GUARD FOR AMERICA'S AIR DEFENSE

THE F-102 IS A RAPIER in the hand of the U.S. Airman.

At its controls, he flashes through the skies at supersonic speeds, day or night in any weather. With it, he can seek out the invader . . . strike and destroy him.

Built for the U.S. Air Force, Convair's F-102 interceptor is delta-winged and jet-powered, designed for the men who are *on guard for America's air defense.*

Advanced aircraft like the F-102 are the result of engineering that aims at the maximum . . . the Nth degree of air power . . .

Engineering to the Nth power

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A DIVISION OF GENERAL DYNAMICS CORPORATION

Wear the wings of the U.S. Air Force. If you are 19 to 26, you may qualify for cadet training. Write to: Aviation Cadet, Headquarters United States Air Force, Washington 25, D.C.

AIRTRENDS Washington, D. C., March 28, 1955

MAJOR CHANGE IN DEFENSE Department policy on jet contract maintenance is signalled in recent $3-million contract award to Southwest Airmotive Corp. for overhaul of Allison J33 jet engines. Heretofore, civilian agencies other than engine prime contractors have been excluded from jet overhaul bids.

Success of this first venture will spell the Pentagon's course in the future. Pending the results at SAC, additional contracts will probably not be forthcoming for another twelve months.

Industry interest in the J33 bid, while limited to only five firms, was broad in its scope. Competing along with Southwest were two major airlines, an airframe producer, the engine manufacturer, and another overhaul agency.

SET-UP IN ARMY PLANNING for increased use of helicopters and assault transports for aerial support is in the cards. Recent naming of Maj. Gen. James Gavin to post of Deputy Chief of Staff-Plans and Research all but assures such an eventuality.

Reason is that Gavin, who commanded the 82nd Airborne Division during World War II and later wrote "Airborne Warfare," is a firm supporter of the strategy of "vertical encirclement" of enemy ground forces using helicopters and assault aircraft.

Expected with his appointment is an early development of larger successors to current transport and helicopter designs, such as the Chase/Fairchild C-123B transport and Piasecki H-16 and Sikorsky S-56/S-58 helicopters.

MUCH DISCUSSED POLICY on the award of first production contracts to development companies has finally been clarified. New directive from Defense Secretary Charles E. Wilson specifics that price advantage alone should not dictate award to another company unless a fair price cannot be worked out with the developer, or unless the price advantage is so substantial that it outweighs other factors.

Reason given is that initial procurement of such items as radar, guided missiles, aircraft and rockets usually involves: (1) extensive preliminary R&D work; (2) continuing equipment improvement; and, (3) substantial time and effort in developing a prototype.

LATEST DEVELOPMENT IN GENERAL MOTORS' announced bid for permanent leadership in the aircraft jet engine field is a $75-million expansion program for its Allison Division aimed at giving it one of the world's best jet development centers.

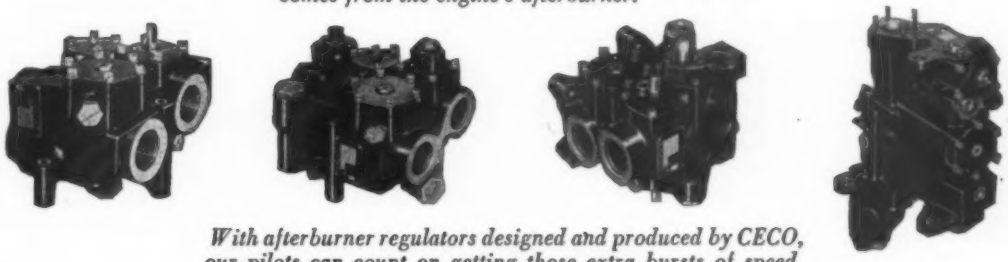
Plan calls for increase of total facilities on a 310-acre plot, doubling of engine research area to nearly 1,000,000 sq. ft., and increasing engine development staff by about 40%.

Among first projects will be development of new jet engines on the order of twice the thrust rating of present models. Based on today's 10,000-pound-thrust standards, new Allison models would probably be in over-20,000-pound-thrust class.

TOP OFFICIALS OF MILITARY DEPARTMENTS and National Advisory Committee for Aeronautics are pulling no punches in bluntly warning Congress on research budget cuts. At stake is a 35% hike in NACA's fiscal 1956 budget to $75.5 million to support operation of three new wind tunnels and mark its entry into aircraft nuclear propulsion research.

Circle No. 9 on Reader Service Card.

When the need arises, our jets must get up and at 'em fast . . . airborne and on the way to intercept within seconds of the first radar alert. The added power to thrust several tons of fighting craft into the air in a hurry — to supply "throttle-burst acceleration" for delivering the knock-out punch — comes from the engine's afterburner.



With afterburner regulators designed and produced by CECO, our pilots can count on getting those extra bursts of speed . . . power in a pinch . . . when needed most. And from the CECO engineering-production team you can count on jet-engine components designed and built to meet your most exacting requirements.

CHANDLER-EVANS

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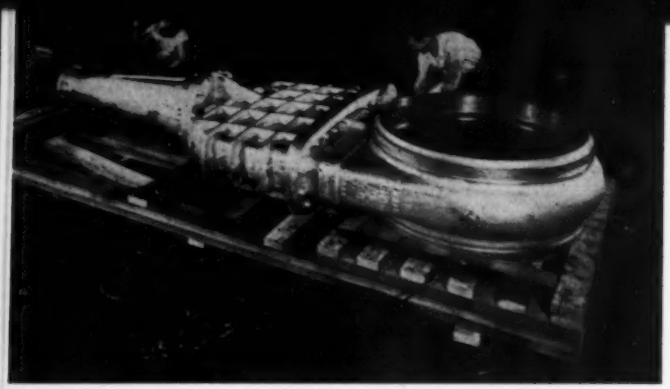

CENTURY NOTE. Workers put finishing touches on valve for Pratt & Whitney's Wilgoos turbine laboratory, one of products which have kept Crane Co. in business 100 years.

BUSINESS

Crane Company's Future Hitched to Diversification

"TODAY GROWTH involves diversification, taking on new related lines or adding entirely new products. This helps create new markets instead of just saturating markets that already exist."

The advice comes from John L. Holloway, president of the Crane Co., which is currently celebrating its first hundred years in business. As the firm reached the century mark it gave evidence that it was following its president's theory. The brass couplings and lightning rod tips which were its staples during the early days have now given way to the anti-skid device (Hytrol) and other aircraft accessories of its subsidiary, Hydro-Aire, to transistor research, to titanium production through another subsidiary, Cramet, and a long list of other aviation and non-aviation products.

Recollections of the past were also occupying the president of United Air Lines, W. A. Patterson, recently. Top airline transport of 1929, Boeing's 80-A, would cost almost twice as much as Boeing's jet 707 today, estimated Patterson, if the earning power of the two aircraft was taken into consideration. Price tag on the 1929 transport was $85,000, vs. the jet cost of $4 million, but seat-miles available annually came to 3.15 million vs. 153 million. Result: one jet transport equals 49 Boeing 80-A's in earning power.

PROFIT & LOSS

Firm	Period	Earnings Latest	Earnings Previous	Earnings/Share Latest	Earnings/Share Previous
Bellanca	Yr 12/31	(16,424)*	231,793	....	1.01
Boeing	Yr 12/31	36,976,023	20,318,178	11.39	6.26
Eastern Airlines	Yr 12/31	7,152,012	7,921,367	2.88	3.20
Kaman Aircraft	Yr 12/31	344,046	206,853	1.13	0.69
Lockheed	Yr 12/31	22,445,966	15,462,079	7.94	5.51
Northeast	Yr 12/31	138,112	492,913	.11	0.54
Northrop	Q 1/31	3,614,976	608,125	2.43	0.41
"	6 m 1/31	6,601,612	1,120,440	4.44	0.75
Ryan	Q 1/31	446,332	595,033	1.17	1.55
Temco	Yr 12/31	2,937,249	2,668,210	1.75	1.59
United Air L.	Yr 12/31	9,617,694	9,072,382	3.52	3.29
Western Air L.	Yr 12/31	1,458,699	1,184,864	2.04	1.66

* Loss

DIVIDENDS

Firm	Period	Amount	Payable	Record Date
Continental Air Lines	....	12½¢	3/31	3/17
Douglas Aircraft	....	Stock*	3/2	2/2
Grumman	Qtr	50¢	3/21	3/11
McDonnell	Qtr	25¢	4/1	3/18
Northrop	Qtr	40¢	3/26	3/14
Temco	Qtr	15¢	4/15	3/14

(* ½ share capital stock for each share held)

FACILITIES

• **Mallory-Sharon Titanium Corp.** has completed a new smelting plant at Niles, O., bringing its smelting capacity to 15,000 tons a year, triple the former total.

• **Boeing Airplane Co.** will build a Mach 1.2-Mach 4 wind tunnel, with a 4 x 4 ft. test section. Cost: $2 million.

• **General Electric Co.** breaks ground this spring in Syracuse, N. Y., for the third building in its Heavy Military Electronic Equipment "systems center." New 69,000 square foot structure will house engineering laboratories and a marketing section.

• **Westinghouse Electric Corp.** will erect a plant and office building of 350,000 square feet at Friendship Airport, Md., adjoining its Air Arm Division.

• **North American Aviation Inc.** will build the first private industrial research reactor on the campus of the Illinois Institute of Technology for the Armour Research Foundation.

CONTRACTS

• **Douglas Aircraft Co.** reveals that it has sold all assembly line positions for DC-6B's and DC-7's through 1956, and has some scheduled into 1957. At the same time American Airlines reportedly ordered nine more DC-7's, in addition to its original 25, and North American Airlines ordered three more DC-6B's, for 1957 delivery. For the Navy, Douglas put out orders to its subcontractors for the AD-7 Skyraider, and received an additional $8 million on its F4D-2 Skyray production contract.

IN THIS ISSUE . . .

March 28th, 1955

Production Spotlight

• Long range improvement of Pratt & Whitney's J-57 jet engine is being funded by a new $12 million Navy contract. It calls for experimentation in new blades and materials, presumably including use of high temperature reinforced plastic compressor blades.

• British production of Solar Aircraft Co.'s 60-horsepower Mars gas turbine engine will be handled by Sugg Solar Ltd., a new firm jointly owned by Solar and Wm. Sugg & Co. Ltd. It is believed to be the first U. S. turbine to be licensed for British production.

• Latest in Navy sub-hunting equipment aboard Grumman S2F tracks both surfaced and submerged submarines. The radar dome for tracking surfaced vessels is telescoped from within the fuselage during hunting operations and the magnetic airborne detector boom is extended from the tail cone to detect and "home" on submerged subs.

• Handley Page Ltd. now has orders (or letters of intent) for 29 of its Herald "DC-3 Replacements": 20 from Australian National Airways; 6 from Lloyd Aereo Colombiano; and 3 from Queensland Airlines. A twin-engine version using the Bristol Hercules 811 may be built and a turboprop version using a new 1000 hp Bristol engine is being considered. Standard Herald has four Alvis Leonides Majors.

• Safest aircraft factory in 1954 was Douglas-Santa Monica which reported 0.67 lost time injuries per million man-hours, according to National Safety Council. National average was more than twice this figure: 1.70. In second place was Northrop Aircraft's Hawthorne plant (0.75); third was North American Aviation's Downey plant (0.79).

• Largest backlog in its history ($315 million) was reported this month by Douglas Aircraft Co. following orders for 109 transports valued at $180 million by 17 airlines during January and February. Breakdown includes 49 DC-6 types and 60 DC-7's bringing the total orders for both types, including military, to 819.

• New streamlined DC-3 main wheel well door design developed by Pan American World Airways Latin American Division is said to increase cruising speed by 10 mph. Rework is adaptable to DC-3's with R-1820, R-1830 or R-2000 engines and is CAA approved. PAA is offering the change to airlines and individual operators at its Brownsville, Tex. Customer Service Base.

• Vickers-Supermarine is working on quantity production of N.113 fighters for the Royal Navy. The twin-Avon aircraft differs very little from the swept-wing Vickers-Supermarine 525 in structure and balance except that it has a "tooth" wingtip. Performance is similar to the Hunter's.

• First USAF production C-130A turboprop cargo transport has been rolled out ahead of schedule at Lockheed-Marietta. After several weeks of scheduled ground tests, first flight will probably take place in April.

• The de Havilland Dove has run into fatigue trouble. Britain's Air Registration Board has reduced the safe life of the transport's lower center section spar boom from 3600 to 2500 hours and lower wing spar boom life has been cut from 8000 to 5000 hours.

•New flight-opening door being flight tested by Fairchild Aircraft Division replaces the clamshell door on C-119 Flying Boxcars and is slated to be retrofitted on more than 100 operational aircraft. One arrangement provides that the bottom door section retracts into its upper section for paratroop operations or release of supplies. A second arrangement allows the entire upper section to be raised to give an unobstructed opening the height and width of the fuselage for dropping heavy equipment.

AEROJET-GENERAL NEEDS:
CHEMICAL ENGINEERS, CHEMISTS, ELECTRONIC ENGINEERS, MECHANICAL ENGINEERS, PHYSICISTS, AERONAUTICAL ENGINEERS.

HIGHER PAYLOADS *and* HIGHER PERFORMANCE

This compact, light-weight rocket powerplant, designated by the U.S. Air Force as the LR63-AJ-1 liquid-propellant rocket, has been successfully flight-tested on the Republic F-84F airplane. Used for assisted-takeoff, this powerplant and its big brother, the YLR45-AJ-1, which was extensively flight-tested on Boeing's B-47B Stratojet during 1954, have proved the practical application of rocket power to piloted aircraft.

SOLID- AND LIQUID-PROPELLANT ROCKET POWERPLANTS FOR MISSILE AND AIRCRAFT APPLICATION • AeroBRAKE THRUST REVERSERS (SNECMA) • AUXILIARY POWER UNITS AND GAS GENERATORS • ELECTRONICS AND GUIDANCE • ORDNANCE ROCKETS • EXPLOSIVE ORDNANCE AND WARHEADS • UNDERWATER PROPULSION DEVICES • ARCHITECT-ENGINEER SERVICES FOR TEST FACILITIES

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MORE POWER FOR AIR POWER

Circle No. 11 on Reader Service Card.

Personal View

By WAYNE W. PARRISH

New Age in Air Power

AS WITH all great changes in history, no man can say exactly when the era of the unmanned missile assumes a greater impact over warfare and industry than the era of the manned airplane. It is probable, as in all such great periods of transitions, that the deed is accomplished before the fact is fully recognized.

Thanks to Assistant Secretary of the Air Force Trevor Gardner in his recent speech to the USAF Institute of Technology graduating class, the maze of missile security has been penetrated to a larger extent than heretofore. In a single paragraph of carefully-chosen words he highlighted the new era as follows:

"It is my feeling that the guided missile—and the kind of destructive force it can carry—forecasts, perhaps more than any single item in our military arsenal, what the Air Force of the future will be like—the 'shape of things to come,' if you will, in our defensive and offensive power. This is not to say that the era of the manned airplane in warfare is over. It is to say that the era of the unmanned missile in warfare is very much at hand—and, more and more, as technology progresses, the impact of the guided missile in military, scientific and industrial planning and organization is going to be felt."

Mr. Gardner might well have enlarged on his thesis to point out the vast changes that are coming within the aircraft industry itself. Ten years ago one spoke of "airframe companies," but that tag is no longer applicable. Not a single major firm is without its missile program and in many instances missiles are overtaking airframes in attention of management and engineering.

Just the other day Convair recruited thirteen scientists from leading laboratories and universities as consultants. The group embraced physicists, mathematicians, and astrophysicists among others. Month by month leading aviation firms are hiring new types of specialists for nuclear research, electronics, guided missiles and various types of new weapons systems that are a far cry from the airframes which constituted the basis of warfare only a few years ago.

As Mr. Gardner said, the manned airplane for warfare is certainly not a thing of the past. It is not likely ever to be. But the complexion of the aviation industry is undergoing a vast change. Several years ago guided missiles were the coming thing; today they are at hand. The new era is here and so too, before long, will be the era of nuclear power in the air.

Good Precedent

THE AIR FORCE has made good on its promise to contract maintenance and overhaul work to fixed base operators by awarding a $3 million contract for overhauling Allison jet powerplants to Southwest Airmotive at Love Field in Dallas. This is the first time a fixed base operator has received such an AF job. It is also the first time that a jet powerplant overhaul contract has been awarded outside of the manufacturing industry or handled at AF bases. We think the move is commendable.

Two at the Post

TWO NEW MEN have stepped into important aviation responsibilities in Washington.

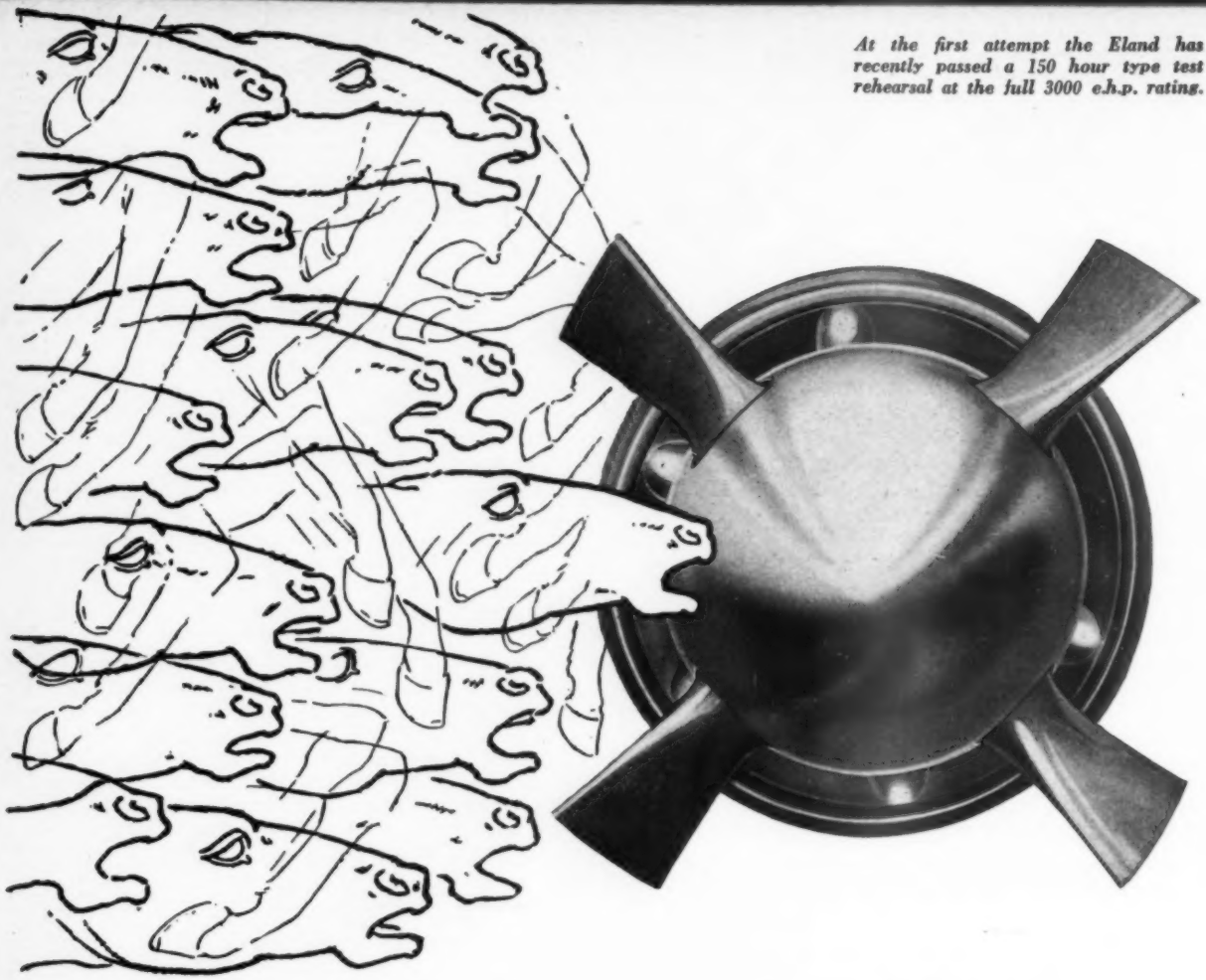
Ross Rizley shows real promise as the new chairman of the Civil Aeronautics Board. With the full support of the White House and with backing from a wide segment of Congress, he lost no time in assuming leadership and launching some housecleaning. Early returns are all in his favor. The former Oklahoma Congressman will not easily be pushed around. He's trying hard for a record.

Louis S. Rothschild is a direct opposite of his predecessor, Robert B. Murray, Jr., as Under-Secretary of Commerce for Transportation. A successful businessman with a good record of government service before him as chairman of the Maritime Commission, Mr. Rothschild is a self-assured administrator who is as tough across the executive's desk as he is smooth and polished in a drawing room. While aviation is but one of his activities in the Commerce Department, it's certain that civil aviation will receive most of his attention.

Mr. Rizley lost little time in grasping the elements of his immediate problems. Mr. Rothschild's grasp of CAA problems is yet to be disclosed. Certainly he walked into a hornet's nest the very first day in the form of the TACAN-VOR/DME air navigation controversy. We sincerely hope he has not come into his position with a closed or committed mind on air navigation but will help root out the mysteries behind the sudden TACAN push. The controversy needs to be aired thoroughly and evaluated technically. Mr. Rothschild is also faced with a very considerable problem with regard to federal aid for airports and here again we trust he has an open mind. We hope he will be a champion and indeed a staunch crusader for civil aviation.

Reconfirmation Out

ALTHOUGH the airlines were by no means unanimous—the vote was 21 to 10—we believe the majority was sound in repealing the reservations reconfirmation rule which has been so unpopular with the traveling public. It is very difficult to apply a single rule of this type uniformly over the entire country covering all conditions. If a few carriers wish to retain the rule for certain applications, this should be satisfactory, but universal application was not satisfactory. Now we'd like to see the airlines act on American's proposal to establish a penalty for non-use of first class reservations. This is a rule which the public can understand.



At the first attempt the Eland has recently passed a 150 hour type test rehearsal at the full 3000 e.h.p. rating.

3,000 horses in 36 inches

From Napier of England comes the Eland, a fine example of modern design and manufacturing techniques in the aero-engine field. The Eland is a single-shaft propeller-turbine developing 3,000 e.h.p. at take-off, with a maximum diameter of only 36 inches. This small frontal area gives the engine an unusually high aerodynamic efficiency.

CHECK THESE OTHER IMPORTANT ELAND FEATURES:

- Low specific weight—0.52 lbs/e.h.p. at take-off
- Low specific fuel consumption—0.450 lb/e.h.p./hr. at 36,000 ft. 400 knots cruising
- Easy maintenance—independent unit construction
- No turbine overheating—mercury vapour variable datum controller
- Safeguard—in the event of any mechanical failure between engine and gearbox the over-speed governor continues to be driven by the engine. The oil system pumps (driven by the propeller) continue to supply oil to operate the auto-pitch coarsening.
- Smooth acceleration and handling, thanks to excellent compressor characteristics.

NAPIER Eland turbo-prop

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Industry News Digest

Two Aviation Firms Enter Atomic Power Field

The scope of nuclear power in aviation was widened last week when Convair announced a team of scientific consultants and a major engine manufacturer entered the picture. Curtiss-Wright, the Air Force revealed, is now at work on atomic power for aircraft.

This news left only Allison, among the engine leaders, out of the nuclear engine program. Already at work: G. E., Pratt & Whitney, Fairchild and Westinghouse (the latter in submarine propulsion).

Heading Convair's atomic staff is physicist Dr. Frederic de Hoffman, who on April 15 becomes asst. v. p. for nuclear planning. Working with de Hoffman and Convair president McNarney will be a consulting group of 14 scientists.

- **In theoretical physics:** Drs. H. Bethe, Cornell; K. M. Case, Univ. of Mich.; C. L. Critchfield, Univ. of Minn.; C. M. Mills, Univ. of Calif.; E. Teller, Univ. of Calif.; J. A. Wheeler, Princeton.
- **Metallurgy:** Drs. R. F. Mehl, Carnegie Institute; F. Seitz, Univ. of Illinois.
- **Experimental physics and electronics:** Dr. L. J. Chu, M. I. T.
- **Mathematics and aerodynamics:** Drs. T. von Karman, NATO-AGARD; R. Courant, N. Y. U.; P. D. Lax, N. Y. U.; M. S. Plesset, Cal. Tech.
- **Astrophysics:** Dr. F. L. Whipple, Harvard.

Industry Backlog Down

Manufacturers caught up on their backlog to the tune of $2 billion in the last year. Figures just made available by the Department of Defense show that at the end of 1954, $14.8 billion in orders was on the books for complete aircraft, engines and propellers. The total was down from the previous year's $16.8 billion. During the last quarter of 1954, over $2 billion in net new orders came in, 14 per cent of the total.

Overlapping this tally, in point of time, is an Air Force and Navy summary of orders and spending during the first seven months of the fiscal year. From the two services came orders for almost $3.6 billion in aircraft and related procurement, close to $3 billion from the USAF, the rest from the Navy. At the pay-off end of the production line, the USAF laid out over $4 billion, the Navy over $1 billion.

• • •

How such orders filter down to subcontractors was illustrated by some predictions from Ryan Aeronautical Co. Last year the firm received a subcontract for the aft fuselage of Boeing's KC-135. In January a similar contract came through for the mid-fuselage. This month stockholders were told that the firm expects a major share of the jet tanker-transport's subcontracting program. Result: an expected gross sales figure for 1955 very close to last year's $45 million. Ryan also makes components for the P&W J57 engines which will power the KC-135.

IAM Dispute Settled; Five Carriers Involved

Most of the 15,000 ground employees of Capital, National, Northwest, TWA and United represented by the International Association of Machinists-AFL have been awarded a retroactive pay hike of 6 cents an hour from July 1, 1954, to January 1, 1955. After that, rates vary among the carriers to make them standard for all five. Only Eastern Air Lines' portion of the joint bargaining remains unsettled.

Friendship Airport Takes WNA Overflow Traffic

Approval of an "anti-congestion" program that calls for interim use of Baltimore's Friendship Airport as a secondary facility to Washington National Airport was announced by the White House last week. The move is temporary, pending construction of a new and nearer airport to the national capitol.

The program was drafted by Commerce Secretary Weeks, Air Force Secretary Talbott and Budget Director Hughes in response to a request initiated by President Eisenhower a year ago.

Southwest Airmotive Gets Jet Overhaul Contract

A change in Air Force policy on contract maintenance has resulted in Southwest Airmotive of Dallas getting a $3 million J-33 jet engine overhaul order. Until the contract with Southwest was announced last week, the Air Force had let maintenance contracts only on piston engines up to the R-1800 class.

Southwest was one of six bidders for the contract, to get underway this summer and which will result in the eventual phase-out of all J-33 overhaul now being done at the Air Force's Middletown, Pa., facility.

The new contract is considered a test case by the Air Force, and it will be about a year before the service expects to let any other similar contracts. Special tools will be transferred from Middletown to Southwest's engine facility at Dallas. Even so, Southwest will provide about $1 million in tooling and equipment of its own.

FIRST PRODUCTION Bristol Britannia shown during test trials at Filton, England, from which is recently flew the 6070 statute miles to Khartoum in 17 hrs. and 24 minutes flying time. It is now undergoing tropical tests in Africa.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

How we keep a tiger from losing its bite

SEVERAL YEARS AGO, "blowout" troubles sometimes made fast fighters useless in high altitude combat. The severe effect of high pressure inside the canopy, low pressure outside, would pop the inflatable seal between the canopy and fuselage. It had to stretch so much to make an air-tight seal it couldn't take the strain. When that happened the pilot had to get down fast.

Today, most new fighter pilots don't know what a canopy seal blowout is. The reason: B. F. Goodrich developed an inflatable seal that holds cockpit pressurization at altitudes of eight miles and up. It stands the strain because it eliminates dangerous stretch. The seal protects over a dozen of our hottest fighters like the new Grumman F9F-9 Tiger, shown above.

B. F. Goodrich's inflatable seal has a rubberized diaphragm that rests inside a U-shaped solid rubber base. Inflated, the diaphragm simply lifts against the canopy to make an air-tight seal. It's like blowing up a paper bag. Dangerous stretching (like blowing up a balloon) is eliminated.

The seal inflates almost instantly. And even at minus 65° it inflates with less pressure than old-type seals needed at room temperature. Also, it resists wear and damage better. Fits curves better. Seals and unseals faster. Minimizes sliding wear and scuffing.

This seal is another example of B. F. Goodrich's contributions to aviation progress. Other B. F. Goodrich products for aviation include: tires, wheels, brakes; De-Icers; heated rubber, Pressure Sealing Zippers; fuel cells; Rivnuts; Avtrim; hose, accessories. *The B. F. Goodrich Company, Aeronautical Sales, Akron, Ohio.*

B.F.Goodrich
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USAF Heavy Press Program Gets Underway

New Presses Will Speed Production of Lighter, Stronger Airframe Parts

By ROBERT M. LOEBELSON

THE USAF's heavy press program, after more than a decade of planning and anticipation, started taking shape and making shapes this month. The new presses are destined to speed U.S. aircraft production.

First of the six extrusion presses in the program—a 14,000-ton-capacity Schloemann unit imported from Germany—has been operated since 1953 by the Aluminum Co. of America at Lafayette, Ind.

And earlier this month, the first of four giant presses—a 35,000 tonner designed by Loewy Construction Co.—started turning out aircraft forgings at the Wyman-Gordon Co. facility in North Grafton, Mass.

Still to start operations, but completely built, are eight more presses:

• **A 50,000-ton-capacity Loewy** forger which will begin in June or July at Wyman-Gordon.

• **A 35,000-ton United Engineering Co.** forger should be in operation now at Alcoa's Cleveland facility.

• **A 50,000-ton Mesta** forging press will start shipments to aircraft companies sometime in April from Alcoa-Cleveland.

• **A specialized 12,000-ton Loewy** extrusion press for propellers is scheduled to be active by April 1 at Curtiss-Wright Corp.'s Buffalo plant.

• **Two 8000-ton Loewy** extruders will be ready at Kaiser Aluminum & Chemical Corp.'s Halethorpe, Md., works in May and July.

• **Two extruders for Harvey Machine Co.'s** Torrance, Calif., facility—a 12,000-ton Lombard and an 8000-ton Loewy—will probably not be ready until October because Harvey has not yet broken ground to house the completed presses.

The Air Force calls its present heavy press program a 10-press plan.

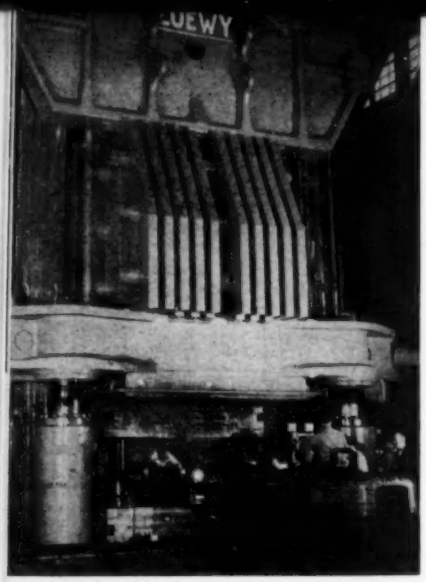
1. F-102 will make wide use of large forgings and extrusions.

There is, however, an 11th press which is not included in the program for budgetary reasons. It is a 13,200-ton-capacity extruder built by Germany's Hydraulik Co. and destined for Dow Chemical Co.'s plant in Madison, Ill. This press was damaged slightly in transit from Germany and present indications are that it will not be operative until the end of the year. (Also not part of the USAF program, but closely related to it, is a Navy Bureau of Aeronautics 6000-ton-capacity extruder which will be installed at Reynolds Metals Co.'s Phoenix, Ariz., plant. Reynolds already has a facilities contract but the Navy has not yet designated a press builder. If the press were ordered now, it probably would be ready in 12-15 months.)

• **These 12 presses** will join a battery of other smaller forging extrusion machines presently in operation in various parts of the country to turn out intricate one-piece aircraft parts which are presently made by more conventional methods. These large forgings and extrusions will not only be stronger than their present-day counterparts; they will also be lighter in weight—a very important factor in current aircraft production.

The use of such large presses to speed plane production was pioneered by the Nazis during World War II. Late in the war, the U.S. followed the example and ordered an 18,000-ton forger from Mesta Machine Co. for Wyman-Gordon. That press went into operation in 1946—too late for use in

2. Four spars in Convair's delta interceptor cut weight by 100 pounds.



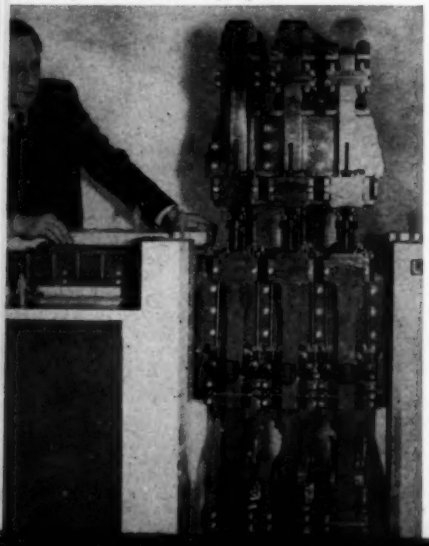
3. First of the large forging presses—35,000 tons pressure at Wyman-Gordon.

the war—and remained the largest in this country until the 35-000-ton Loewy delivered its first forging, an aluminum alloy wing spar for the Convair F-102 interceptor, on March 7 at North Grafton.

Soviet Russia, on the other hand, has been operating large presses for several years. The Reds "liberated" (with tacit Allied approval) a 33,000-ton forger and a 13,200-ton extruder in 1946 along with plans and personnel to build a 55,000-ton forging press. It is known that the Russians were building the 55,000-tonner because several West German companies have had inquiries about delivering parts.

(The U.S. also confiscated several German presses, including two 16,500-ton-capacity forging units. One is now at Alcoa-Cleveland, the other at the USAF's experimental facility at Adrian, Mich., which is now operated by the Bridgeport Brass Co. The 33,000-ton unit captured by the Russians is identical to the two USAF-owned Schloemann's except that it uses one platform rather than two.)

4. Loewy Construction Co.'s Erwin Loewy inspects model of one of the firm's six presses in USAF program.



Thus, with the 12 Navy and USAF presses coming up, the 18,000-ton Mesta, and the two 16,500-ton Schloemann's and three 5500-ton extruders (at Adrian, at Dow Chemical in Madison, and at Canton Drop Forging Co. in Canton, Ohio) and others, the U.S. would seem to be in an enviable position. But the nation's press builders and many aircraft executives are convinced that even larger presses will soon be required.

On July 11, 1950 (just after Korea) a top-secret report issued by the National Security Resources Board said the U.S. was 25 presses short of its mobilization needs. At that same time the USAF heavy press program consisted of the 10 presses mentioned above plus:

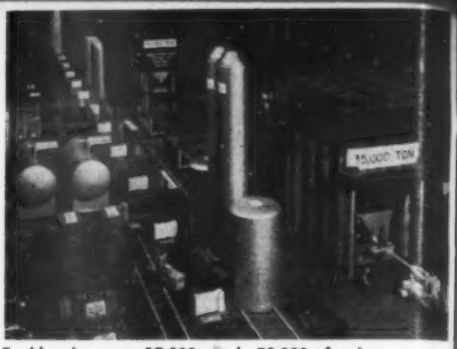
- **Loewy's 75,000-ton** forger for Wyman-Gordon.
- **Bliss 35,000 and 25,000-ton** forgers for Kaiser Aluminum at Newark, Ohio.
- **United's 35,000-ton** forger for Harvey-Torrance.
- **Baldwin-Lima-Hamilton's 25,000-ton** forger for Harvey-Torrance.
- **Loewy's 25,000-ton** extruder for the USAF facility at Adrian.
- **Loewy's 20,000-ton** extruder for Alcoa-Lafayette.
- **United's 20,000-ton** extruder for Harvey-Torrance.
- **Loewy's 8000-ton** extruder for Reynolds-Phoenix.

The largest press of each type was eliminated (the 75,000-ton forger and the 25,000-ton extruder) early in the game because, reports had it, the aircraft industry did not have enough experience to design planes using such large forgings and extrusions. And the program thus became one involving 17 presses.

• **First USAF request to finance 17** heavy presses was approved by Congress at $210 million. The following year, the then Assistant Secretary of the Air Force for Materiel, Roswell L. Gilpatric, asked for $179 million more, simultaneously assuring Congress that no further requests would be made. But it was later discovered that a total of $510 million would be needed to cover both the presses and the facilities to house them. As a result, seven more were deleted by Air Secretary Talbott in June, 1953.

Now, it is reported, the USAF is already considering reinstating at least one of the previously eliminated presses, the 20,000-ton Loewy extruder for Alcoa-Lafayette, which was half-built when construction was stopped.

• **One of the experts** in the heavy press field, Alexander Zeitlin, vice president and general manager of the Loewy Construction Co., told AMERICAN AVIATION that the USAF and the aircraft industry will be highly pleased with the results of the presses just starting to operate and will call for larger ones in both the forging and extrusion areas very soon. He anticipates a revival order for the 20,000-ton extruder.



5. Alcoa's new 35,000 and 50,000 forging presses will soon be operative at Cleveland.

"It is my opinion," he said, "that the next round will involve extrusion presses with capacities of 40,000 to 50,-000 tons and forging machines ranging far beyond 75,000 tons."

The Loewy official predicted, however, that the USAF will soon discover a requirement for smaller specialized presses, which could be ready in less than two years. Included would be machines designed specifically to turn out propellers, landing gear, turbine blades, disks, and shafts. They will be necessary in part, he said, because of new materials, like titanium.

"Take the main landing gear for the B-36 or B-47. It starts out as a 28,000 pound steel cylinder and after conventional machining ends up weighing only 1800 pounds. With steel at 40¢ a pound, that is not too bad. But we can't use titanium, now $10 a pound, the same way. It would be prohibitive financially."

• **Another authority,** Robert W. Stoddard, president of Wyman-Gordon, gives another example of the value of heavy presses. He cites the F-102 spar shaped by the 35,000-ton press. It is 12 feet long, 18 inches wide and 3/16th of an inch thin in some areas.

Four of these spars are used in the delta-wing Convair all-weather interceptor. These four spars will replace 272 parts and will save 3200 rivets in each plane, simultaneously creating a weight saving of 100 pounds. Other work already ordered from the Wyman-Gordon 35,000 tonner includes parts for the Republic F-105 fighter-bomber and the Boeing KC-135 jet tanker. The 14,-000-ton extruder at Lafayette has been turning out parts for the Boeing B-52 since its inception. • • •

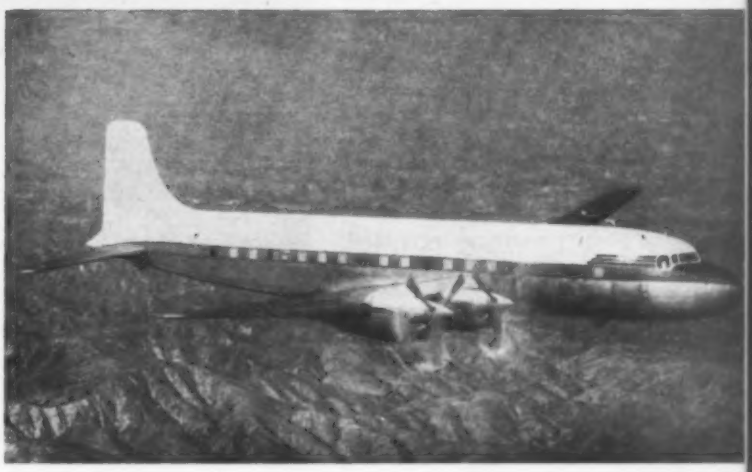
Which Turboprop for American Airlines?

By ANTHONY VANDYK

IT IS NOW BECOMING APPARENT that the principal reason for American Airlines' hesitation about ordering a short/medium-range turboprop transport to replace its fleet of Convair 240's is the high cost of the aircraft proposed to it by the U.S. aircraft industry. Details of AA's requirements together with the proposals of Convair, Douglas and Lockheed were reported in AMERICAN AVIATION of January 31. The tag on the cheapest of the three U.S. entrants in AA's competition, the Dart Convair, is reported to be in the one million dollar bracket while the Douglas and Lockheed aircraft are priced substantially higher.

Although Douglas and Lockheed are keeping tight-lipped on their projects it is not difficult to estimate the approximate tag on the former's proposal, a DC-6B or DC-7 airframe with Allison T56 turboprop engines. Last year when there was considerable discussion of a Rolls-Royce RB109-powered turboprop version of the DC-7 (the DC-7D) it was disclosed that this aircraft would cost two and a half billion dollars. The Lockheed proposal, which is a new design somewhat resembling the C-130, would almost certainly cost more than two million dollars.

The British entrant in the AA competition, the stretched-fuselage Vickers Viscount 803, is priced in the one million dollar bracket but it does not meet AA's specifications which basically call for an aircraft substantially better than that of the Viscount 700 series (the type bought by Capital Airlines).



DOUGLAS has proposed a DC-6B or DC-7 airframe with Allison T56 turboprops

The Dart Convair, fitted with the 2200-hp RA7 Dart, will have a slightly better performance than the present Viscount's but inferior to the Lockheed's or the Douglas'. Nevertheless, indications are that Convair could deliver its product well ahead of the other two U.S. manufacturers, and in the turboprop transport race time is going to be an important factor. (For this reason it is not out of the question that AA will obtain a small quantity of Viscounts to tide it over competitively until a superior U.S. model is available for service.)

• **First official details** on the Dart Convair confirm the accuracy of AMERICAN AVIATION's exclusive story on the project (November 22, 1954). It has the same wing planform and area as the Model 340 but uses an 18-foot longer fuselage to accommodate additional passengers and nose radar. The tail is the same as that used on the T56-powered YC-131C, about 12 in. higher and 20 in. wider on each side than the 340's. The Darts are mounted in four monocoque nacelles which are structurally integral with the wing; the inboard nacelle monocoque sections are longer and wider than the outboard nacelles in order to incorporate main landing gear retracting wells.

• **The maximum structural weight** of the Dart Convair is 68,000 lbs. At 59,800 lbs., the maximum landing weight, the cruise airspeed at 13,000 feet is 330 mph. The full payload is 14,500 lbs. and the full integral wing fuel tankage is 2000 gallons; two 300-gallon detachable tip tanks are also proposed. The Dart Convair can carry full payload with full integral fuel against a 50-mph headwind at a cruise altitude of 13,000 feet, with two hours reserve fuel for cruise at 5000 feet at 1.3 speed for minimum drag for 750 statute miles or from New York to Chicago.

• **Equipped with tip tanks** and carrying 10,400 lbs. payload, cruising at 23,000 feet at 310 mph with a reserve of 200 miles at cruise altitude plus ¾ hour at 5000 feet at 1.3 minimum drag speed the maximum range is 1540 miles. Take-off with full payload and fuel for a 200-mile trip will require a 4500-ft. runway and landings will be made within this same distance.

• **The Dart Convair's** cabin pressurization system is designed to supply all occupied compartments of the air-

CONVAIR's entrant in the AA competition is a stretched-fuselage Model 340 airframe powered by four Darts.

plane with an air flow of approximately 110 lbs. per minute at sea level, and approximately 80 lbs. per minute at 24,000 feet. The aircraft holds a sea level cabin altitude up to an airplane altitude of approximately 14,000 feet. At altitudes above 14,000 feet, a maximum pressure differential of 6.0 psi is maintained. At 23,800 feet airplane altitude, a cabin altitude of approximately 6000 feet is maintained.

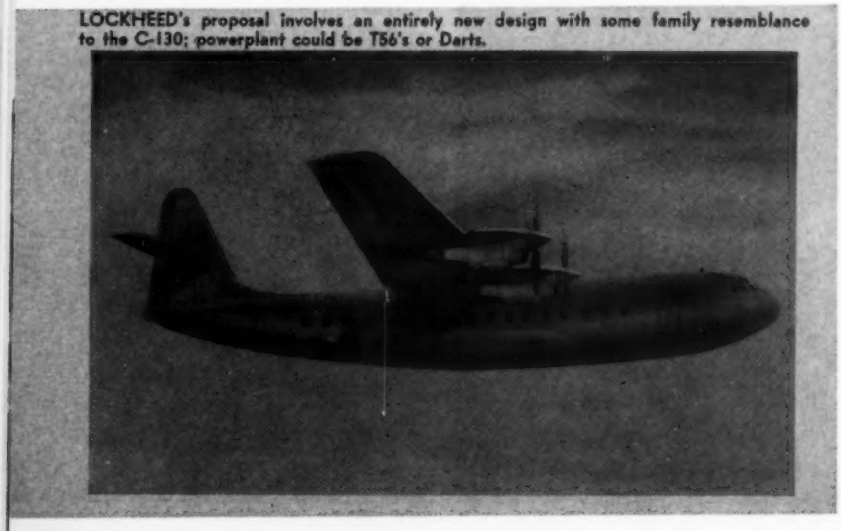
The primary sources of cabin ventilating air are two single-stage, two-speed compressors mounted on and driven by the accessory gear boxes located in the accessory section of each inboard engine nacelle. The major components of the air conditioning system, including heat exchangers and refrigeration units, are installed under the passenger cabin floor bteween the rear spar and the aft baggage compartment.

Heated air for the cabin, additional to that derived by heat of compression from the cabin superchargers, is supplied by a combustion heater located in an inboard engine nacelle, which also supplies heated air for anti-icing the empennage when required. Heated air for anti-icing the wing leading edges is supplied by one combustion heater installed in each outboard engine nacelle.

The main cabin is 51 ft. 3 in. long and 18 in. wide. It accommodates 60 passengers in thirty double seats. All are adjustable from 7 deg. to 36 deg. Seat spacing is 40 in. A window 18 in. by 18 in. is installed at each double seat and emergency exits are 20 in. wide by 34 in. high installed at the fifth window aft on each side of the fuselage, above the wing. The main entrance door and co-acting folding stairway is mounted on the left side of the fuselage, about nine feet forward of the propeller plane. Two toilets are provided—one on each side of the fuselage—forward of the passenger compartment.

VICKERS has proposed the stretched-fuselage Viscount 803.

The passenger seats are of a special design and each one incorporates a serving tray that pivots at the base of the seat and folds quickly into position for dining. When not in use the seat and tray are mounted on a common axis; operation of the seat to the reclining position does not affect movement of the tray when it is in use. The tray becomes a part of the seat only when it is in the stowed position. Seat back adjustment controls are located near the front of the inboard and outboard arm rests so that a passenger may operate the control without moving from a relaxed position. The control operates a mechanical seat lock which permits the seat back to be moved to any position. The lock may be overridden by forward pressure on the seat back; this allows the cabin attendant to return the seat to an upright position without using controls. • • •



LOCKHEED's proposal involves an entirely new design with some family resemblance to the C-130; powerplant could be T56's or Darts.

Air Cargo Operations To be Speeded Up

A door-to-door air cargo service is scheduled for inauguration within the next few weeks by Slick Airways, according to board chairman Delos W. Rentzel. The cargo carrier will use the services of three of the country's largest trucking firms to provide a truck-air-truck system similar to Air Express but with faster deliveries.

The service will be initiated between Cleveland, Pittsburgh, and Phoenix. It will later by extended to all 20 cities currently served by Slick.

"It will be possible," said Rentzel, "when the system is in full operation, to move an entire household from coast to coast over a week end at a price no higher than the present ground transport, which takes a week or 10 days."

Aircraft Hourly Earnings Reach New Peak

Average hourly earnings (including overtime) for the aircraft industry last year reached $2.12 in December, according to the Bureau of Labor Statistics, up seven cents from the average for January, 1954. In 1950 the average for the year was $1.64.

Average weekly earnings, including overtime, were $68.39 in 1950, $83.23 in the beginning of 1954, and $87.77 as the year closed.

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Hi-Ti Production Ends 30-Month Research Program

CULMINATION of a $500,000 30-month-long crash research program was marked early this month by Standard Pressed Steel Co. of Jenkintown, Pa. in the announcement of production of the first successful titanium aircraft tension bolts.

SPS president H. T. Hallowell, Jr., disclosed that production bolts have already been shipped to the Aircraft Production Resources Agency at Wright-Patterson Air Force Base, Navy Bureau of Aeronautics, and to 18 leading airframe and engine manufacturers in the U.S. and Canada.

The new titanium bolts, called Hi-Ti, are said to be capable of substitution part-for-part in the place of high strength steel bolts, yet weigh only 57% as much as their steel counterpart. Pound for pound this means that 25 Hi-Ti bolts weigh slightly less than 15 standard MS steel bolts, and savings in a single aircraft can range as high as 1000 pounds, SPS officials said.

Hallowell stresses that Hi-Ti is a production item—not a laboratory curiosity. As part of its $500,000 development program, the company spent $100,000 for an expanded and specially outfitted fatigue test laboratory to thoroughly prove out the new bolts. Plan is to test each lot of bolts sold and to provide the purchaser with tension fatigue data.

Test information of this kind, SPS has found, is the only assurance that a titanium tension bolt will perform satisfactorily. "That's why we call them pedigreed bolts" Hallowell adds.

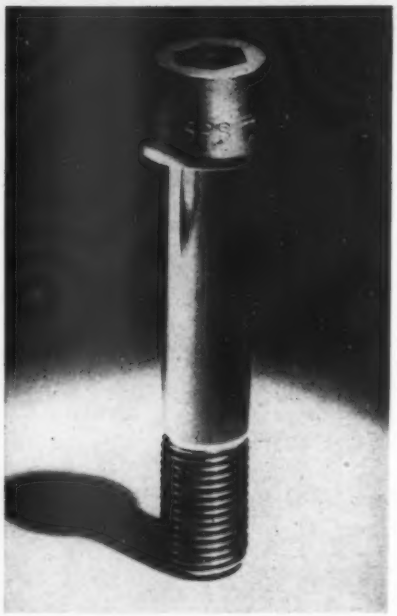
Although the first Hi-Ti articles produced by SPS were all ½" diameter—2¾" long internal wrenching bolts, other types and sizes are in production. All initial bolts being developed are designed as direct replacements for present-day Military Standard 2004 series bolts, high strength pieces used in critical fastening jobs in aircraft and engines.

Tests at SPS showed that in virtually every category of comparison, the new titanium bolt proves superior to steel. Only when considering static tensile strength without regard to fatigue (ability to withstand a single pull) did the 174,000 psi steel specimens surpass the 169,000 psi for titanium. However, if weight is considered, the tensile strength-to-weight ratio of the titanium was 70% higher than steel.

Under fatigue conditions, even without considering weight, tests showed that a ½" Hi-Ti bolt had an endurance strength of about 50,000 psi—25% greater than the 40,000 psi of a comparable high-strength steel bolt. Under a load of 77,000 psi (a MIL Specification condition) the titanium bolts lasted an average of more than 100,000 cycles before failure whereas steel bolts failed at an average 85,000 cycles.

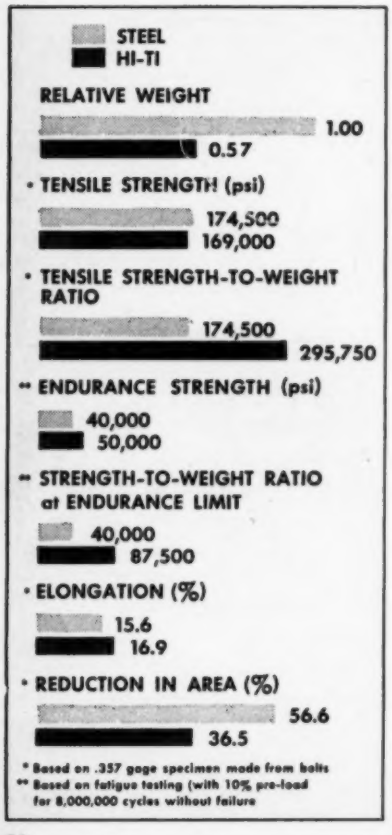
The tests run by SPS were extensive and time consuming even with the benefit of new fatigue testing equipment. One big handicap was the lack of suitable fatigue test data on present-day high strength steel bolts needed for comparison with Hi-Ti.

As a result, valuable laboratory time had to be allocated first to fatigue testing of steel bolts, then to proving the success of the new development. The company estimates that the determination of the last three points on its two S-N (stress versus No. of cycles) curves for two titanium bolts and four steel bolts took close to 1200 hours machine time. • • •



NEW LIGHTWEIGHT titanium tension bolt produced as direct replacement for MS steel bolt.

WEIGHT TO STRENGTH FACTOR



LATEST VERSION OF THE DASSAULT MYSTERE, the Mystere IVB1 or Super Mystere, is powered by a Rolls-Royce Avon and is claimed to be supersonic in level flight.

Judge a Product by its Users

The sleek, delta wing Convair F-102A, newest Air Force all-weather interceptor, achieves supersonic speeds in level flight. Even the service and maintenance operations are streamlined and fast because hydraulic, pneumatic, fuel and oil lines are equipped with Aeroquip 3000 p.s.i. Self-Sealing Couplings.

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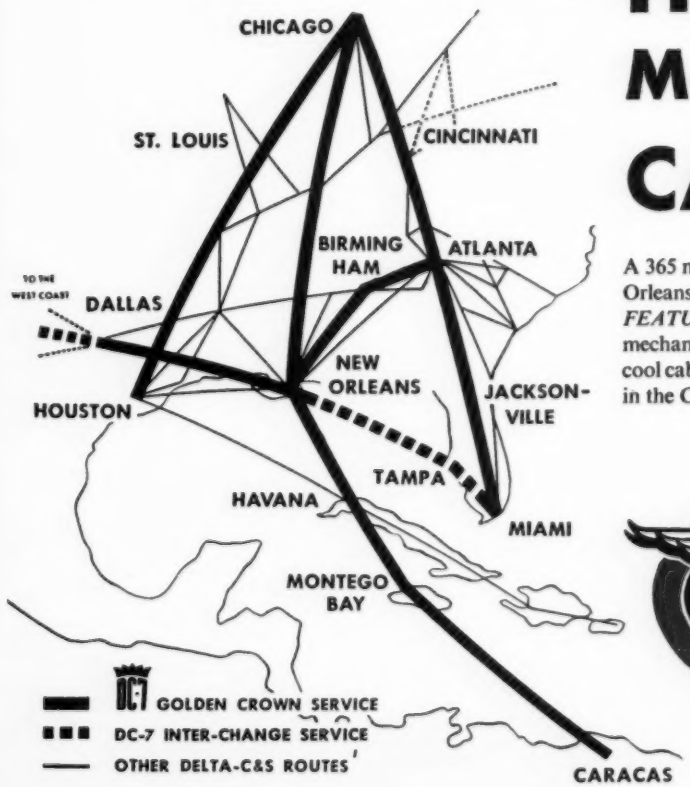

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The Qualities of an Air Force Ace

WHAT DOES IT MEAN to be an ace? By definition it means that the pilot in question has shot down five enemy planes. It may also mean that the pilot is a skilled worker whose efficiency in doing his job far surpasses that of his colleagues who are not aces, according to an Air Force study.

How far this efficiency exceeds that of the average pilot was illustrated in Korea. Eight hundred F-86 pilots flew 25 or more missions against the Communist MiG-15's. Of this number, only 4.8% became aces. But this 4.8% accounted for 38.2% of the kills made by the group. More than one kill in every three went to this small group of 38 men, out of the 800 pilots involved.

As creditable as this record was for the aces, it raised a question: why the difference? Late in 1953 the USAF set out to find the answer. Headquarters Far East Air Force sent in a request that a study be made, Headquarters USAF agreed, and the Air Research and Development Command was given the job. ARDC's Human Factors Operations Research Laboratories, together with the Human Factor Directorate, set to work. The goal: to discover those respects in which aces differed from non-aces with similar backgrounds.

By searching official records for data on age, flying experience, etc., by asking the Korean F-86 pilots to fill out long questionnaires on their childhood, and by interviewing aces and non-aces face-to-face, ARDC's team came up with some points on the profile of an ace.

One Big Factor: Motivation

Efforts Exerted	Number of aces and "near-aces" (4 kills)	Number of non-aces
Just drifted into the F-86 assignment; no attempt to exert influence on decision	2	17
Some special attempt to get F-86 or other fighter assignment; request granted without any further effort	9	5
Numerous special efforts and maneuvers. Used influence, strategy, bombarded commanders with requests	16	5

• *Age and experience paid off.* "The more successful pilots were on the average older and higher ranking, had been longer in service, and had had more flying experience," said the ARDC. Contributing to this result were two factors: the more experienced pilots tended to get assignments, like flight leaderships, that offered more opportunity to make kills.

• *The aces were dead set on being aces.* A far greater percentage of them had gone to some lengths to receive assignments to fighters, to F-86's, and to combat. Non-aces tended to take what the USAF gave them in assignments (see table). Most of the aces stated that they had strongly desired additional combat duty after completing their first tour, in contrast to an opposite trend among the non-aces. Among all the fighter interceptor pilots there was general agreement on the importance of motivation in determining combat success.

• *In personality make-up,* the aces tended to be socially well-adjusted, habitual risk-takers (on the ground and off), with a background of independent, "trouble-making," but non-neurotic behavior.

"The "trouble-making" took the form of testing the limits—seeing how far allowable behavior extended. In flying it took the form of experimenting with their aircraft until they knew just how much they could wring out of an F-86. To less adventuresome (or inquisitive) pilots this sometimes looked like daredeviltry. Games involving risk and strategy were their favorites in growing up, fights were more common in their childhood background, and they were keenly enthusiastic about the virtues of competition.

When aces and non-aces were presented with queries about their attitudes toward competition, the non-aces took the middle ground: seven disliked it or were indifferent: 15 thought it was a good thing"; only four were enthusiastic to the point of "competition is a great thing and I love it."

Among the aces the scores were weighted heavily on the side of competition. None were averse to it or lukewarm. Only four chose the middle ground. Twenty-three were enthusiastically in favor. Concluded ARDC: "The aggressiveness displayed in combat by the most successful fighter interceptor has a long history in the life of the individual."

The situations of stress, such as the loss of fellow-pilots, the aces reported themselves less disturbed emotionally than the non-aces.

• *Family backgrounds* also differed between the two groups. The aces, in line with their early trend toward independence, were more likely to have come from homes in which one parent or both had died. They also were more likely to have been members of large families that moved from one town or one part of the country to another. Although the financial backgrounds of their parents did not indicate any significant differences, the parents of aces were more likely to have put stress on the importance of improving one's position in the world.

These differences, plus an assortment of others which turned up, are not likely to be hastily interpreted and made the basis of a recruiting campaign. The sample was a relatively small one (approximately 30 aces and 30 non-aces were subjected to the entire study); some of the information was gathered only after the pilots had become aces, some before; and some of the factors involved in the situation could not be reduced to quantitative terms. • • •

Top Korean War Aces

Capt. Joseph McConnell, Jr.
16 Kills
Died Aug. 25, 1954

Maj. James Jabara
15 Kills

Capt. Manuel Fernandez, Jr.
14½ Kills

TWIN J-57s POWER THE

NEWEST FIGHTER and the first with two J-57 engines, is this new "century series" Air Force fighter being tested at Edwards Flight Test Center in California. The big, long-range McDonnell F-101 is 67 feet in length and has a wing span of 39 feet.

NEW VOODOO FIGHTER

The most powerful jet fighter ever built in America—the first with two J-57 turbojets—is joining the U. S. Air Force's supersonic team of "century series" fighters.

It is McDonnell's F-101 Voodoo, a long-range fighter-bomber capable of carrying atomic weapons and slated for service with the Air Force's Strategic Air Command.

Like its supersonic sisters, the F-100 Super Sabre and the delta-winged F-102, the F-101 Voodoo is designed to take full advantage of the tremendous thrust provided by Pratt & Whitney Aircraft J-57s and their afterburners.

In the new Voodoo, Pratt & Whitney Aircraft's J-57 continues to make its vital contribution to American Air Power.

OVER 20,000 POUNDS OF THRUST and outstanding fuel economy are available in the F-101 from twin P&WA J-57s and special afterburners, like that on the J-57 shown above. They are about two feet shorter than other J-57 afterburners. This engine equipment makes the long-range Voodoo the most powerful fighter known today.

Pratt & Whitney Aircraft

MAIN OFFICE AND PLANT: EAST HARTFORD, CONNECTICUT • BRANCH PLANTS: NORTH HAVEN, SOUTHINGTON, MERIDEN
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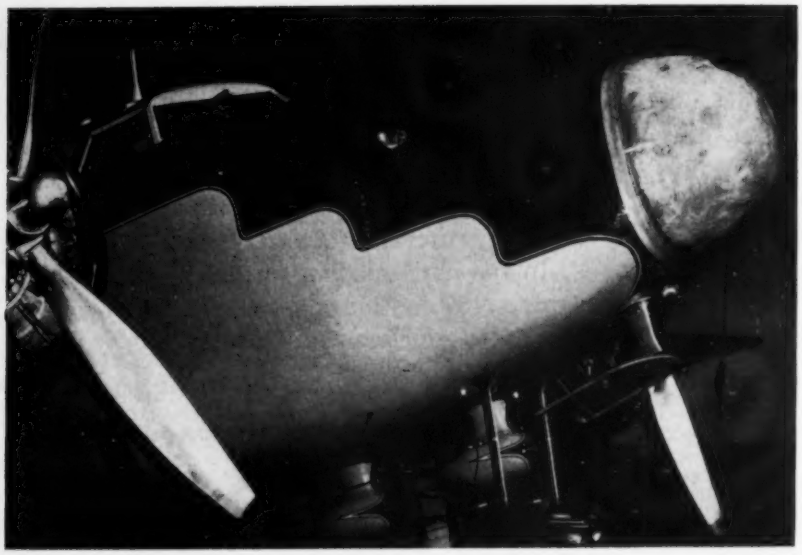
Business Aircraft Gets Airborne Radar



RADOME CASING, made of semi-transparent fibrous glass, is shown in the rough prior to being coated with neoprene base paint, matched to the plane's trim color.

SEEING-EYE of the Bendix RDR-1 Airborne radar system, the ANT-1A antenna scanner, is mounted in the rebuilt nose of the Lodestar, beefed up to receive it.

ONE OF THE FIRST installations of airborne radar on a business aircraft was completed recently by Page Airways, Inc., of Rochester, New York. The Bendix Airborne Radar System was installed in the nose of a Lockheed Lodestar owned by Forrest Oil Company of Bradford, Penna.

The radar system was installed to give better flight safety through storm areas. It provides the pilot with en-route weather information, enabling him to avoid extreme turbulence and hailstorms, thus reducing the possibility of structural damage and making for a smoother ride.

• **Mounting the antenna** of the radar system required a major engineering modification to the nose of the Lodestar, which had to be "beefed up" and required a new bulkhead. Once the antenna of the Bendix RDR-1 was mounted, it was encased in a semi-transparent radome, which was covered with a neoprene base paint matching the trim color of the airplane.

The system includes five elements, including the antenna scanner mounted in the nose; control unit in the cockpit; PPI-1A indicator; a synchronizer, amplifier, power supply unit placed in the radio rack, along with the RDR-1A transmitter-receiver. The RDR-1 uses a pencil beam, scanning an angle 90 degrees or more to either side of the aircraft with a useful range up to 150 miles.

• **The "Iso-echo" contours** of the PPI scope allow pilots with limited training to quickly assimilate weather data. By examining the scope, they can learn at glance the position, intensity, and extent of the storm cell or cells. With this data, pilots can work their way through a storm, avoiding the most turbulent areas, Bendix states.

The complete system adds about 245 pounds to the weight of the aircraft. • • •

Hiller Sees Future For Ram-Rocket Engine

A helicopter blade-tip engine which combines the features of ramjets and rockets has been "seriously considered" by Hiller Helicopters, Inc. The engine, called a "ram-rocket," decomposes rocket fuel within the shell of a ramjet, then burns the resulting gases as a second source of thrust, similar to afterburning.

Such an engine might be only three quarters the size and half the weight of a comparable ramjet, according to J. B. Nichols of Hiller. One considerable advantage of the ram-rocket, Nichols told a joint meeting of the American Helicopter Society and the American Rocket Society, lies in the fact that the rocket portion of the thrust can be used to bring the rotor up to speed from a standstill, eliminating the need for auxiliary starting systems.

Rocket fuel, such as propane or ethylene oxide, is fed into a chamber inside the ramjet engine. There, in the presence of a catalyst and a glow plug, it decomposes, producing hot gases which exit through a series of nozzles. The gases then mix with the air which has come in the front of the ramjet, and the mixture is ignited by a spark plug.

Application of pure rocket engines to the tips of a Sikorsky S-55 was described to the meeting by W. R. Brown, of Reaction Motors Inc. One-pound engines at the tips of the rotors, fed from a hemispherical tank over the rotor hub, produced a 20% increase in power, 100% increase in sea level take-off payload, and twice the rate of climb, Brown reported. Fuel is hydrogen peroxide, Dry weight of system is 67 pounds.

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C-130A Turbo Prop Cargo Plane—aerial view of Plant at Marietta, Georgia

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Tacan Row Moves to Congress

• House Committee Hears of $170 Million Procurement

BY JOSEPH S. MURPHY

THE MIGHT OF MILITARY INFLUENCE which last month achieved an Air Navigation Development Board decision in favor of the TACAN navigation system (AMERICAN AVIATION, Feb. 28) has run headlong into an equally powerful force. The new element combines the voice of civil VOR/DME supporters on Capitol Hill and an array of Congressional committees more than willing and even anxious to hear it.

QUARLES

In an unprecedented wave of activity for a subject so technical as the VOR/DEM-TACAN issue, virtually every House and Senate Committee with any jurisdiction at all has either started or plans hearings. The activity reached such a peak earlier this month that Sen. Styles Bridges (R-N.H.) called for investigation by a Joint Committee of both branches of Congress.

Earlier, the House Committee on Government Operations—Military Operations Subcommittee had held a day-long hearing of military testimony on TACAN development and procurement. In addition, both the House and Senate Commerce Committees heard both civil and military witnesses in separate executive sessions.

• **The Defense Department,** which stands to lose much and gain little from the inquiries, is meeting the situation with its first team. Top ranking officials defending the ANDB action before these groups are Defense Secretary Donald A. Quarles, Asst. AF Secretary Trevor Gardner and Asst. Navy Secretary Raymond H. Fogler.

In the executive branch, new Commerce Undersecretary for Transportation Louis A. Rothschild is looking into the matter. When questioned by the Senate Commerce Committee during hearings on his appointment, Rothschild told that group he had no opinions in the matter then, but had set up a series of conferences and hoped to have some knowledge of it by the time he was in a position to act officially. It was his predecessor Robert B. Murray, Jr. who touched off the present row when he "reluctantly" voted Commerce support to TACAN after CAA representation in the ANDB study had opposed it.

Supporters of civil DME are looking to Rothschild for action to delay the June 30, 1955 date set by ANDB after which DME service would no longer be guaranteed. But if such a postponement is being considered, the decision will have to be made soon. CAA's fiscal 1956 budget (submitted before the ANDB decision) asked funds for DME operation, and Commerce will have to either defend or alter Murray's action during forthcoming Congressional appropriations hearings if any funds are to be made available.

• **First insight** into the background of TACAN development and procurement came to light during hearings by the House Military Operations Subcommittee. Donald Quarles, Defense R & D chief told this group that Navy work on the system began as early as February, 1947 before civil VOR/DME were systems in being. From 1949 to 1951, he said, development was continued on a classified basis for important tactical reasons and to preclude compromise. Although ANDB work on VOR/DME at that time was proceeding along lines technically incompatible with it, no one devised a way to bring them together.

ROTHSCHILD

The ANDB decision, Quarles feels, is the best escape from the dilemma. He testified that it will be least costly to the taxpayer, will best satisfy civil and military aviation needs, and "despite its uncertainties" has the greatest potential for common system use.

• **Quarles spiked rumors** that such airlines as United, American and Pan American had protested the Air Transport Association position on TACAN and that it might therefore not be representative of carrier's feelings. The Defense chief said he talked personally to the presidents of Pan American and Trans World Airlines and that the opposite was true. He said further that he has talked to no president of any airlines who opposed the decision.

Since Quarles appearance, however, a Northwest Airlines' official told American Aviation that it is instituting an independent study and will not take a position until that is concluded. A spokesman for Mohawk Airlines, which has been testing civil DME under

TACAN DEVELOPMENT

1947—Feb.: Chief-Naval Operations set requirement for carrier navigation system. BuAer and BuShips ask proposals from Sylvania, RCA, Bendix Radio, Sperry & Federal. Latter two bid and Federal is accepted.

1948—June: Contract let for ARN-16 TACAN providing azimuth only.

1949—June: ARN-21 contract let to FTL-distance added to ARN-16 azimuth.

1950—June: Contract let for 10 evaluation models. July: BuAer asks speed-ups. Sept.: Demonstrated to Joint Communications Electronics Committee.

1951—Adoption by JCEC with accuracy limits increased. Evaluation by Navy Operational Development Force finding system satisfactory. June: 1st production order with FTR signed. USN-USAF TACAN steering group formed. December: FTR given ground equipment contract.

1952—Feb.: Demonstrations by FTL to USAF, Navy, UK and Canadian Officials. Sept.: 1st of 40 development models delivered. Start of testing by three Navy groups. System engineering evaluation by Melpar, Inc., Patuxent Air Test Center, Wright and Rome Air Development Centers. October: preliminary ground set tested by Patuxent WADC and RADC.

1953—May: Three URN-3 ground sets delivered for AF-Navy evaluation.

1954—January: 1st production ARN-21 delivered. 400 sets released for production. Equipment deficiencies uncovered, evaluated, and changes made in balance on order. September: Contract let to FTR for 625 ground units.

1955—January: ARN-21 production released. 55 URN-3 ground sets delivered.

ANDB contract, also said that airline has some definite views on the subject but cannot make them known until a later date.

Defending both the ANDB decision as well as military TACAN expenditures was Asst. AF Secretary Trevor Gardner. He contended that two years ago when the new civil Pentagon heads "inherited" the problem, instead of making immediate irrational decision, they brought the best technical competency in the country to bear on it. "I believe we made the right decision, Gardner said, but if some facts can be developed to prove we didn't, that's another subject.

But during the open hearings he declined to go into any detail on current TACAN reliability. Under questioning by Committee Chairman Chet Holifield (D-Calif.) on its present reliability and how many "bugs" are in it, Gardner said "we would have to do that in executive session."

TACAN PROCUREMENT

Airborne Sets

USAF—4661	$40,361,871
Navy—4679	46,949,514
MDAP—422	5,402,193

Ground Equipment

Total—621	67,384,603

Research & Development

BuAer	5,167,190
BuShips	4,559,703
Tooling	2,139,000

Contracts (Airborne)

FTR—2935	33,380,153
S-C—3652	30,975,866
HLI—2675	24,576,255

VOR PROCUREMENT

USAF—26,000	$91,000,000
Navy—6818 ARN-14	14,999,600
5250 ARN-30	5,666,831
Indicators—39,023	17,700,954

Note: FTR—Federal
S-C—Stromberg-Carlson
HLI—Hoffman Laboratories

As to current USAF status on TACAN he reported that 50 are either in aircraft or are being installed. The Air Force has compiled a list of "bugs" that are fixable, they will be fixed, and reliability will slowly creep up to what it has to be, he said. The testimony made no reference to a reported finding by ANDB technical consultants that TACAN power would have to be increased five-fold to make it an acceptable device.

• **In defense** of TACAN expenditures, reported to involve some $325 millions, the AF official broadly related the program to victory or defeat in a future war. He argued that it is necessary within the spectrum of technical judgment that exists to pick a point at which to gamble on the design and gamble on losing the total race or winning. He said, "We are gambling lead time against ingenuity to outguess the 'bugs'—it happens in every procurement—it just happens to show more in this one."

Still to be explained by the military is a November 1951 Wright Field report that found VOR a satisfactory navigation aid for high speed jet aircraft even after TACAN adoption. As a result of this report, the military developed a sub-miniaturized VOR but never got around to using it.

Just how far Congress intends to investigate the issue still remained hazy at press time. It appeared certain, however, that if a joint House-Senate hearing materializes, it will be long after the June 30 DME deadline before a conclusion is reached. With that prospect in view and postponement of the deadline gaining favor among top Commerce officials, civil DME supporters appear to have won a first round victory. In any event, regardless of the final outcome, the long-hushed controversy will get a full airing, and the future Common System will get back on the track with Commerce, Defense and Congressional support. • • •

NEW BILLS IN CONGRESS

TWO OMNIBUS AVIATION BILLS and a Senate Concurrent Resolution calling for a joint Congressional investigation of the VOR/DME-TACAN air navigation systems dispute featured the fortnight's supply of new legislation.

Rep. Percy Priest (D.-Tenn.), chairman of the House Interstate and Foreign Commerce Committee, and Rep. Carl Hinshaw (R.-Calif.), also a member of the Commerce committee, sponsored the two omnibus-type bills, which resemble similar bills introduced in the Senate earlier by Commerce committee Chairman Sen. Warren Magnuson (D.-Wash.)—(S.1119)—and ranking Republican member Sen. John Bricker (R.-Ohio)—(S.308)—respectively.

Sen. Styles Bridges (R.-N. H.), ranking minority member of the Appropriations and Armed Services committees, accompanied his demand for a joint House-Senate investigation of the TACAN controversy (S. Con. Res. 16) with reference to "recurrent rumors of irregularities." He said he understood the present common-use system was adequate, while the great expense and the unknown quality of TACAN caused him "great alarm."

Aviation bills introduced since March 7, by number, subject matter and author, are as follows (for earlier bills see AMERICAN AVIATION, March 14):

S. 1377 Defines further the national transportation policy, expressing opposition to use of all unlawful tactics, and providing for consideration of evidence of such tactics by applicants for certificates, etc. .....Sen. Magnuson (D-Wash.)

S. 1379 Amends the definition of "airman" in the Civil Aeronautics Act. .....Sen. Magnuson (by request)

S. 1380 Authorizes the imposition of civil penalties for violation of the security provisions of the Civil Aeronautics Act. .....Sen. Magnuson (by request)

S. 1423 Prohibits certain acts and transactions with respect to gambling materials. .....Sen. Kefauver (D-Tenn.)

S. 1442 Adds the term "Air Force" immediately after the term "Navy" in sec. 640 of title 14, U. S. Code, concerning the interchange of supplies between the Armed Forces. ..... Sen. Russell (D-Ga.) for himself and Sen. Saltonstall (R-Mass.) (by request)

S. Con. Res. 16—Establishes joint Congressional committee of 12 members to investigate, report and make recommendations regarding VOR/DME-TACAN air navigation systems dispute. .....Sen. Bridges (R-N. H.)

H. R. 4648 Omnibus Aviation Bill, providing for wholesale amendments to Civil Aeronautics Act, and similar to Magnuson Bill (S.1119). .....Rep. Priest (D-Tenn.)

H. R. 4657 Amends Civil Aeronautics Act to permit air carriers and foreign air carriers to grant free or reduced-rate transportation to ministers of religion. .....Rep. Carlyle (D-N. C.)

H. R. 4677 Omnibus Aviation Bill, similar to Bricker Bill (S.308). .....Rep. Hinshaw (R-Calif.)

H. R. 4882 Amends Internal Revenue Code of 1954 to exempt from tax the transportation of persons to and from Mexico, to and from Central America, and to and from the West Indies. .....Rep. Curtis (R-Mo.)

H. R. 4904 Extends the Renegotiation Act of 1951 for 2 years. .....Rep. Cooper (D-Tenn.)

H. R. 4933 Permits local taxation of the private interest in personal property and work in process and inventories of material acquired by the Federal Government for military security and the national defense but in the possession of contractors with the Federal Government. .....Rep. McDonough (R-Calif.)

First production model of

U. S. Navy's new fighter

surpasses speed of sound—

during routine delivery flight

—the Douglas F4D Skyray

The pilot was seeking no record. But suddenly, his *production model* Douglas F4D Skyray was flying faster than the speed of sound *in level flight!*

Though this supersonic show of speed was unscheduled, it came as no surprise. Skyray is holder of the world's official F.A.I. sea-level speed record at 753.4 m.p.h. Designed for interceptor duty with the U. S. Navy, it is powered by a Pratt & Whitney J-57 engine with afterburner. Agile as well as fast, Skyray has a very high rate of climb and low landing speeds—operates with ease from aircraft carriers... to strengthen the fleet air arm.

The outstanding performance of F4D Skyray is another example of Douglas leadership in aviation. Faster and farther with a bigger payload is always the basic rule of Douglas design.

Be a Naval Aviator, write Nav. Cad., Washington 25, D.C.

Depend on *DOUGLAS*  **First in Aviation**

PEOPLE

Airlines

Charles H. Calhoun, former head of engineering and maintenance of National Airlines, will join Continental Air Lines April 1 as vice president engineering and maintenance.

Calhoun

William M. Ehart, resigned as director of public relations and publicity for National Airlines to head Collins Laboratories in Miami.

F. J. Mullins, elected v. p. and gen. mgr. of American Airlines de Mexico from asst. gen. mgr. He replaces George C. Van Nostrand, who continues with AA as v. p., properties and community affairs.

Julio Argentino Alvarez, named president of Aerolineas Argentinas, replacing Rodolfo Raffaele.

Robert L. Cornish, KLM Royal Dutch Airlines, named passenger sales mgr. in the U. S.

M. G. VanAntwerpen, assigned to New York to head Sabena Belgian Airlines' North American organization, following reassignment of Fernand J. Martens as mgr. for Scandinavian countries.

Harvey H. Johnston, named chief pilot of Canadian Pacific Air Lines' North Pacific Div.

Aksel Nielsen of Denver, elected to the board of United Air Lines.

Robert A. Anderson, formerly with Happiness Tours in Chicago, named general sales mgr. of Resort Airlines, replacing **William R. Beattie.**

George P. Braender, formerly district sales mgr. for Braniff Airways in New York and Boston, appointed U. S. sales mgr. in New York for Varig Airlines of Brazil.

Milton McGreevy, Kansas City investment broker, elected to the board of Braniff Airways.

Frank L. Smith, formerly asst. d.s.m. in Philadelphia for Trans World Airlines, promoted to asst. director of sales promotion.

Smith

Sidney R. Chichester, formerly cargo sales rep., named Latin American Div. cargo sales supt. for Pan American World Airways replacing **Shelby W. Merrill,** resigned. **Peter H. Wenzel,** moved from director and district traffic and sales mgr. in Rome to LAD passenger sales supt., in Miami.

John P. Grember, appointed acting direct mail advertising mgr. for United Air Lines.

Manufacturing

J. B. Macauley, director of technical coordination for Ethyl Corp., granted a year's leave of absence to relieve **Dr. Daniel P. Barnard,** research coordinator of Standard Oil Co. (Indiana), as Deputy Assistant Secretary of Defense (Research and Development).

John K. Northrop, founder and former president of Northrop Aircraft, Inc., elected to the board of The Garrett Corp.

Louis G. Burns, formerly chief pump engineer, named sales manager of the Chandler-Evans Div., Niles-Bement-Pond Co.

Morris F. Ketay named president following the merger of Ketay Instrument Corp. with The Norden Laboratories Corp. Other officials of the merged concerns: **Paul W. Adams,** chairman of the executive committee and exec. v. p.; **Benjamin Gross,** chairman of the board; **Malcolm V. Lane,** treasurer; and **Jack Stadler,** secretary.

Dr. Emory L. Ellis, former head of the rocket dept., Naval Ordnance Test Station, Inyokern, Calif., appointed director of ordnance planning of the research and development laboratories of Rheem Manufacturing Co.

Jack W. Hale named v. p. and gen. mgr., and W. B. Carrell, named exec. v. p. of Chamberlain Engineering Corp. and Chamberlain Aviation, Inc.

Adam E. Abel named director of engineering and research for the Bendix Radio Communications Div. following the promotion of **Arthur C. Omberg** to ass't gen. mgr. of the Bendix Missile Section.

Bruce G. Eaton, Jr., former technical director in the Office of Naval Research, named senior advisory engineer for Westinghouse Electric Corp.'s Air Arm Div.

Lyman A. Bullard, Jr. appointed mgr. of the Flight Safety Products Dept., Greer Hydraulics, Inc.

Todd M. George, Jr. named mgr.-advertising and sales promotion, and **Edwin W. Riggs** named mgr.-marketing administration and personnel development for General Electric Co.'s Schenectady Aeronautic and Ordnance operation.

Vice Adm. Wilder D. Baker, (USN, Ret.) named director of public relations, and **John M. Sayre** named supvr.-advertising and sales promotion for Solar Aircraft Co., following the appointment of **Philip M. Klauber** to chief administrative engineer.

Paul A. Deegan, director of public relations—Lycoming Div., also named director of advertising for Avco Manufacturing Corp. defense and industrial sales.

Dr. David B. Langmuir has joined The Ramo-Wooldridge Corp.'s Guided Missile Research Div.

Thomas L. Norton, formerly ass't works mgr. for Fairchild in Hagerstown, named supt. of tooling fabrication of Temco Aircraft Corp.

Edwin F. Shelley, formerly chief engineer, appointed v. p. of the Bulova Research and Development Laboratories, Inc.

MEN and IDEAS

I DON'T LIKE THE WORDS 'mass production,'" the man in the rimless glasses was saying. He lifted a gray-clad leg over the chair arm. "Let's call it volume production."

Charles (Chuck) W. Perelle, seated behind a broad, tidy desk near where Charles A. Lindbergh's wheels left ground for an historic flight, tried to put into words his production philosophy. Few have a better right to try; he had recently got straight-line production out of the American Bosch Arma Corp. plant in Garden City, L. I.—"probably the first time for precision instruments."

He chopped off an economical right hand gesture. "What we have had here," he said, "is essentially a change from job-shop to volume production. We operate on a rigid schedule and there's nobody here can change it except me. We meet schedule by constant pressure of incoming material, ease the pressure by keeping the communication lines open between engineering staff and production supervisors."

CHARLES W. PERELLE

• **That's a formula** which Perelle learned along a management path that has earned him such sobriquets as "Wonder Boy," "Lightning" and "Eraser of Red Ink." *Time* called him "Rescue Man," and *Forbes* preferred "Trouble Shooter." Perelle has, or has had, clear title to all of those labels.

Only "Wonder Boy" no longer applies—Perelle is 51—but he acquired the name fair and square by rising from paint shop helper at Boeing to superintendent between 1930 and 1937. The other appellations came along as he moved in 1940 to Vultee (general manager), to Consolidated (vice president in charge of production), and to Consolidated Vultee (vice president in charge of manufacturing).

He joined Vultee, Perelle later explained, "when the aircraft industry still mistook confusion for productivity." There he turned a $300,000 monthly deficit into a $1 million profit. The merger gave Perelle a force of 46,000 who had never been able to reach an output schedule of one B-24 a day. Soon, with the payroll reduced to 36,000, the company was making 12 B-24's, three PBY Catalinas, and a total of 33 planes of all types per day. He did this by adapting to the B-24 the first mechanized assembly line for aircraft, a feat accomplished by Perelle at Vultee. During this period, Perelle first publicly alluded to his production ideas. "Would you," he asked an interviewer in 1943, "rather have a precision watch or a handmade watch?"

• **The next stop, 1944 to 1946,** was Hughes Aircraft and Hughes Tool Companies, followed by Gar Wood Industries, Inc., where as president he took a corporation which lost nearly $4.75 million before tax adjustments in 1947 up to a $2 million profit the next year.

In 1949 Avco's chairman, Victor Emanuel, recalled the feats Perelle was able to accomplish for him at Vultee and Consolidated Vultee, when those companies were Avco subsidiaries, and brought him in again to operate ailing ACF-Brill Motors Company. There he found himself trying to make buses but losing $3 million the first year.

"All the place needed was an undertaker," he remarked—and then proved himself mistaken. All ACF-Brill needed was straight-line production—and Perelle. The firm earned $2.5 million in 1951.

Perelle's newest job is a direct result of his success at ACF-Brill. Allen & Company purchased control of ACF-Brill in 1951 and retained Perelle to head it up. Last May 1, Allen and Company moved him over to be chief executive officer of the American Bosch Corporation, as well as the Arma Corporation, and within three months he had put the two companies together, forming the American Bosch Arma Corporation, of which he is now president.

• **His reorganization is complete.** The parent and subsidiary corporations have been merged; a clumsy plant in Brooklyn has been shut down, and its operations blended into the stepped-up program in the Long Island plant, where Perelle has his office. As a result, Arma caught up with orders which had moldered for months and happily faces the future with a production force as able to deliver as its engineers have always been.

Perelle kept up with all of this, plus American Bosch Division plants in Springfield, Miss., and Columbus, Miss., while moving his wife and prep-school son from Bryn Mawr, Pa., to Greenwich, Conn. Now, he hopes to restore his golf game ("I should score in the 90's.") and squeeze in some fishing ("I've got a camp on Georgian Bay, about 200 miles north of Toronto").

• **Activity treats him kindly.** His face is ruddy and smiling. His crisp, wavy hair is only slightly touched with gray. His compact figure must be almost as trim as when, during an Alaskan boyhood, he quarter-backed a Juneau high school team against an Indian reservation team.

Perelle was born in Alaska, where his father was a mining foreman. The boy, too, worked in Klondike mines during school vacations. Later, between engineering studies at the University of Washington, he roamed the Alaskan wilds as part of a mining claim survey group.

"It wasn't uncommon to go months without seeing anybody besides ourselves," he said. "We often traveled a month just to do four hours' work."

Jobs now last longer and fall closer together, Perelle concedes. And what does Mrs. Perelle think about the moving necessary to keep up with an industrial trouble-shooter?

"You'd better ask her." He paused. "She has been a darned good scout."

• **In American Bosch Arma Corp.,** Perelle believes he has combined concept and company to present guided missile designers with an answer to one of their most pressing problems; i.e., how to guide a missile from launcher to target.

A navigation system as absolute as the universe and just as self-contained has been dreamt of by navigators for centuries. Perelle is confident the time has come for the dream to be converted into hardware.

The system which he and American Bosch Arma advocate for missiles is called "inertial guidance" (see box). It is a self-contained system, to be carried aloft by a missile. It determines position by sensing the missile's accelerations and then refers these to a set of coordinates in space and so

Again in 1954

Pan American's First

on the Skyways of the World!

Throughout the world, there are now 60 airlines flying in competition with Pan American World Airways . . . Many of these are government-owned monopolies . . . Yet Pan American, operating under the American private enterprise system, was chosen by more overseas passengers than any other airline, U.S. or foreign.

Across the Atlantic, thirteen airlines now offer both first class and tourist service. Yet *more trans-Atlantic passengers* chose Pan Am's service—both first class and tourist—than any other airline.

And once again in 1954, Pan American carried more passengers *than all other airlines combined:*

—across the Pacific
—to and from Alaska
—to and from Bermuda
—to and from San Juan

Between Hawaii and the Mainland, PAA was again chosen by more passengers—both first class and tourist—than any other airline.

To and from Latin America, Pan American carried more passengers than any other airline. 'Round South America (up one coast and down the other), Pan American World Airways and its 50%-owned affiliate, Panagra, carried more passengers than in any other year.

To and from Havana, Nassau and the U.S.A., Pan American carried more passengers than any other airline flying to these islands. Pan American, the only round-the-world airline, completed its 2,075th scheduled, round-the-world flight during 1954.

During 1954 Pan American made foreign travel possible for millions by pioneering the original, nationwide "Pay-Later" Plan. Since last May, over 7,000 people have invested in "Pay-Later" travel.

In December, Pan American began the only NON-STOP service to both LONDON and PARIS at no extra cost . . . in its exclusive super-powered *Super Stratocruisers.*

In 1954, Pan American's world-wide Clipper* Cargo volume increased 17%. Across the Atlantic alone, the increase was 19%.

COMING IN 1955

New, Douglas-built "Super-7" Clippers—fastest long-range aircraft in overseas service—will be delivered in 1955. Pan American was first to order these super Clippers. They mean even better Pan American service.

*Trade-Mark, Reg. U. S. Pat. Off.

The Rainbow

to all Europe. First in popularity among all trans-Atlantic air tourist services!

The votes are in and the votes have been counted:

In 1954 more people chose Pan American's Tourist service, *The Rainbow,* than that of any other airline . . . U.S. or foreign! In fact, *The Rainbow* shows a 53% increase over 1953!

The Rainbow gives **6** extra values:

1. New, long-range "Super-6" Clippers.
2. Hot meals prepared in the same spotless kitchens which prepare the meals served on Pan American's First Class services.
3. Many NON-STOP flights to London and Paris.
4. Direct service from New York, Boston, Philadelphia, Detroit and Chicago to more cities in Europe than any other airline . . . *no change of plane.*
5. More convenient overnight schedules . . . and your choice of 5 routes—via Shannon, Glasgow, London, Paris or Lisbon.
6. The veteran flight crews and scientific flight procedure which have earned for Pan American its reputation as the World's Most Experienced Airline.

PAN AMERICAN
WORLD'S MOST EXPERIENCED AIRLINE

THE SHRINKING GYRO. Shipboard gyros made by Arma for Navy in years past are shown at left in photo below. At far right, new airborne subminiature unit. Phone shows size.

directs the missile to target.

One big reason for Perelle's confidence is that his firm's Arma Division has in production a subminiature gyro, vital to inertial guidance, which in lightness and accuracy surpasses earlier Arma models by a wide margin.

• **Its accuracy,** which is considerably better than the .04 of a degree of drift per hour common to the massive shipborne fire control gyros of the 1930's, is obtained to a large extent by the elimination of gimbal bearings. This was made possible by floating the gyro element in a fluid, increasing the ruggedness of the instrument while reducing the drift-producing friction torque.

The new gyro is light in weight and performs in two coordinates, from which it derives the descriptive term "two-degrees-of-freedom gyro."

The total torque acting to produce drift in earlier gyro models might be expressed as equivalent of a quarter-inch piece of paper clip hanging on a crank arm one inch long. In the latest gyro, the hypothetical portion of paper clip would measure less than 2/1000 of an inch.

• **With accuracy** provided no better again than that of the massive Arma fire control gyro of the 1930's, Arma claims a tactical missile traveling supersonically over a range of even a thousand miles could be brought down 3.5 miles from any given target area. An advanced unit of considerably greater accuracy is already in pilot production and has been tested extensively.

"They've turned out to be the world's most rugged gyros," says Perelle. "For example, we've been putting them in Army tanks and subjecting them to all the rigors of tank duty. Not one has failed."

By applying design lessons learned on its new gyro, Arma has also reduced friction virtually to the vanishing point in an accelerometer, another key unit in inertial guidance.

Arma now has an airborne unit more capable of measuring accelerations than some of its earlier shipborne elements that could measure as low as 0.000005 G's.

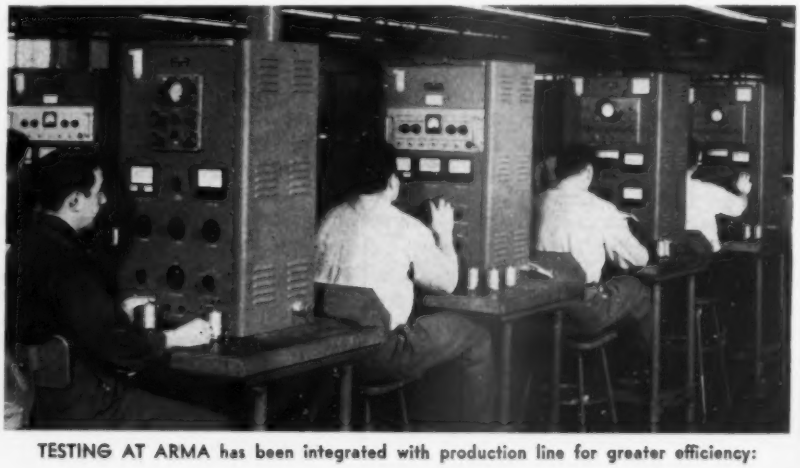
The subminiature gyro is one of a long list of Arma's products, many of which the firm expects to put into an inertial system. Among the components turned out at its three plants (in Long Island, Massachusetts, and Mississippi) are electrical resolvers, synchros, induction motors, induction generators, mechanical differentials, and computing mechanisms.

Arma is believed to be the largest producer of ultra-precise integrators in the U. S.

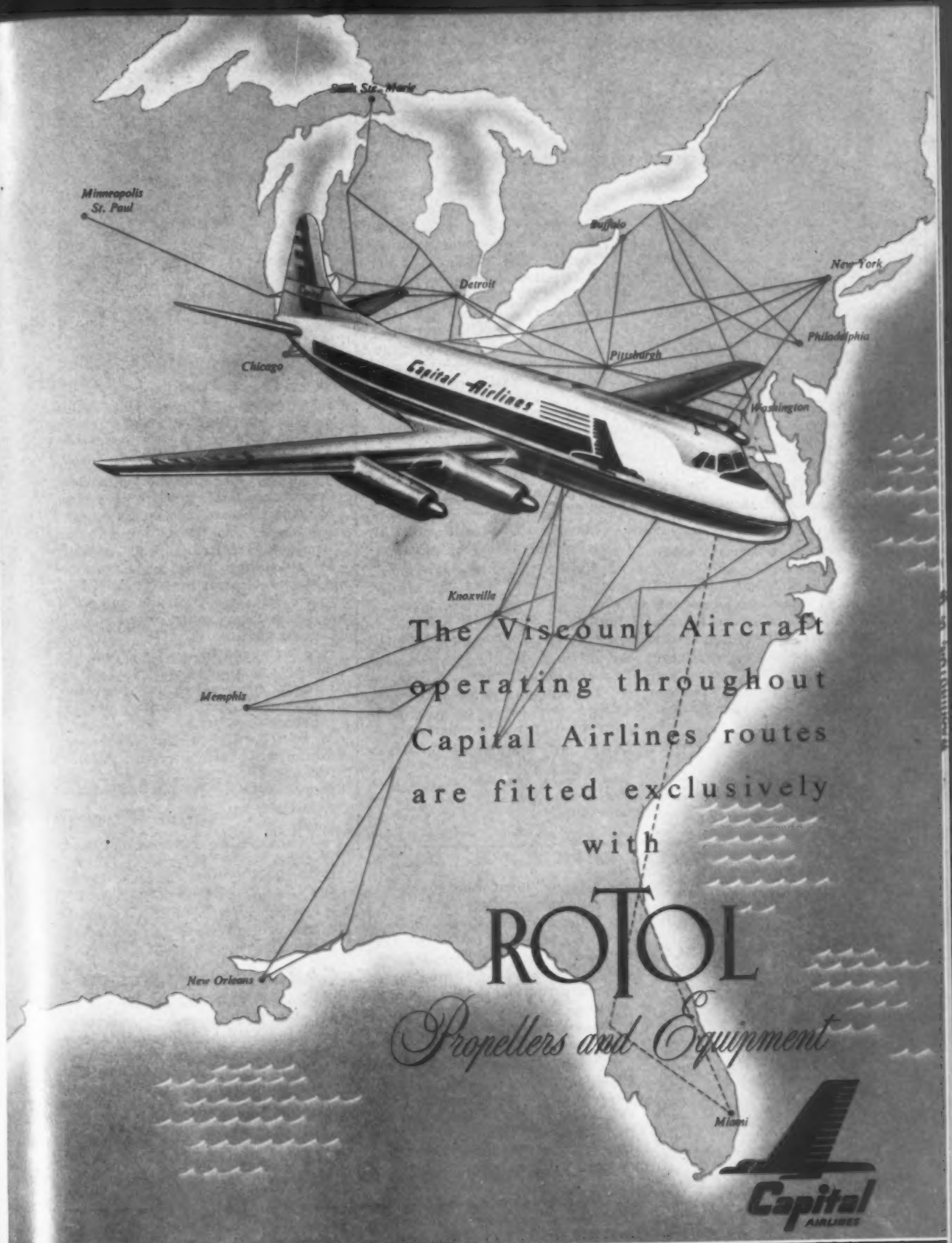
These components in turn become fire control, navigation, anti-aircraft, submarine warfare, and industrial control systems, including some for the Atomic Energy Commission.

• **Eighty-five per cent** of the components of an inertial system are already in production at Arma; the two-degree-of-freedom gyro is now in pilot production.

The company has been in the ultra-precise gyro business for some 30 years, with most of its earlier work done for the Navy's Bureau of Ordnance. During World War II Arma's BuOrd sales came to more than $200-million. At the American Bosch Division, three-quarters of current sales are commercial, complementing Arma's military contracts, 75 per cent of which go to the Air Force and the rest mainly to the Navy and the Army.



TESTING AT ARMA has been integrated with production line for greater efficiency:



The Viscount Aircraft operating throughout Capital Airlines routes are fitted exclusively with

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Since Perelle took over the presidency of American Bosch Arma last July, he has taken steps that will pay off if volume orders for inertial guidance systems materialize. Among things he has done to put the firm in a better production position are these:

• **Introduction of production lines** for rotating components, amplifiers, transformers (see photos);

• **Careful scheduling,** strictly adhered to, with the power to change schedules limited to Perelle himself;

• **Splitting of engineering** into design and production sections, permitting necessary production changes to be made without interfering with long-range programs;

• **Integration of testing** with manufacturing operations. Test of production units was previously separated from the manufacturing area, requiring wasteful, time-consuming handling and movement of products. Redesign of factory areas coordinated the two activities.

• **Achievement of standardization of products,** resulting in interchangeability of units without recalibration.

PRODUCTION LINE METHODS have been introduced at Arma by Perelle. Above, synchro motors for instrument systems ride a moving belt.

Behind the production plans and innovations, there is available a pool of skilled labor numbering between 6,000 and 7,000; 4,200 are now on Arma's payroll, including close to 1,200 in engineering. Floor space for the three plants amounts to 1.25 million square feet. About 40 per cent of its dollar volume is subcontracted to some 2,000 suppliers.

Perelle and his staff are confident that the company's background of experience in manufacturing high precision instrument systems, plus its manufacturing facilities, will enable it to meet any production requirements for inertial guidance system. Already, "definite and serious interest on the part of every aircraft and missile prime contractor has been shown," says Perelle.

Joint sales for the Arma and Bosch Divisions totaled $80 million in 1953, $75 million in 1954, and are headed for an estimated $100 million in 1955. If Perelle is right, inertial guidance systems will play their part in reaching that goal. • • •

What Is Inertial Guidance?

The problems of ordinary, or non-missile, navigation which have taxed navigators sufficiently in the past, are complicated by the nature of the missile and its job. The missile is uninhabited, travels at previously unheard of speeds, and must defy enemy countermeasures. The designer cannot rely on the computing and error-correcting abilities of human crews and yet must achieve accuracies consistent with great speeds and ranges. What is perhaps most difficult, he must provide a system which can be neither tricked nor detected by the enemy.

To complicate the problem, the system, among other things, cannot require prior reconnaissance, must be usable anywhere in any weather at any height, and must not require elaborate ground equipment which can be bombed out.

High frequency radio is limited in range by the curvature of the earth. Low and high frequency radio beams require elaborate ground facilities and are subject to countermeasures. Radar and heat detecting systems may also be misled. Star-tracking devices are at the mercy of the weather

One answer is to do without clues from the earth in regard to position. Instead, inertial guidance uses as its basic reference the takeoff point. Thereafter the missile "senses" all accelerations which act upon it, considers the time during which they have acted, computes velocity, and from velocity, distance and direction traveled.

During the missile's flight, it moves through a universe that consists solely of space, time, and acceleration. No shorelines or rivers, no heat rising from metropolitan areas, no stars, no electronic beams intrude upon its calculations to guide or misguide it.

The hardware that can make such a system possible involves the following components:

•**Accelerometers** to measure acceleration;

•**Integrators** to convert this information into velocity and distance;

•**Gyros** to provide directional reference and to hold the system stable, thus avoiding false acceleration data;

•**Additional computers,** besides the integrators, to calculate course-to-steer and distance-to-go.

Realization of such a system has awaited development of gyros and other components with a combination of high accuracy and light weight, a difficulty which the American Bosch Arma Corp. believes it has now surmounted.

DETAIL VIEW of new subminiature gyro compass.

CAB Attorneys Resign

Emory T. Nunneley, Jr. has resigned as CAB General Counsel, effective March 31. A CAB attorney since 1939 and General Counsel since 1946, Nunneley will join Investors Diversified Services, Inc., in Minneapolis, as general counsel.

Nunneley's resignation followed by days announcement of the resignation of James L. Highsaw from the General Counsel's office, effective March 15. Highsaw, chief, litigation and research division, is joining the law firm of Mulholland, Robie, and Hickey in Washington, D. C.

New Managing Editor Named by American Aviation Magazine

Albert W. Bentz has been named managing editor of AMERICAN AVIATION Magazine, it has been announced by Wayne W. Parrish, editor and publisher. Bentz, who succeeds William D. Perreault, resigned, has been news editor of *Aviation Week* magazine for the past three and one-half years. His 25 years of editorial experience include seven as aviation editor and four as managing editor of the Wichita *Beacon*.

BENTZ

The newly created post of electronics editor of AMERICAN AVIATION Magazine and *Daily* has been assumed by Henry P. Steier, who held the same position on the staff of *Aero Digest* magazine. He was a senior design engineer for 10 years for the Radio Corp. of America, and served two years with International Business Machines Corp.

Francis J. Keenan has become legislative editor of American Aviation Publications, it was also announced. Keenan was assistant clerk of the Senate Commerce Committee from 1951 to 1953, and had previously been an assistant to the late Senator Tobey (R—N.H.).

Missile Obligations Rising Steadily

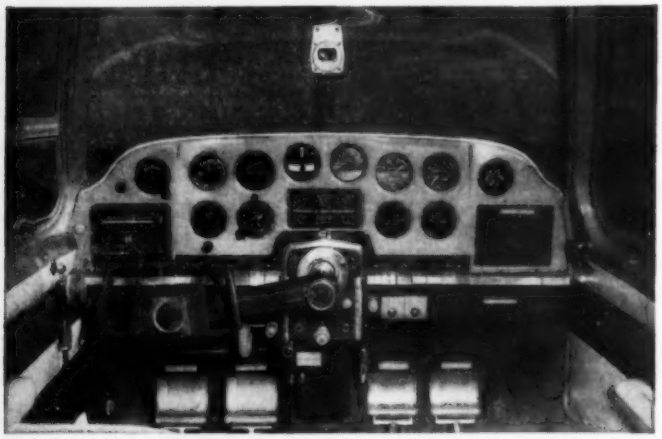
The tapering off in aircraft obligations and the rising emphasis on missiles has been documented by a Defense Department summary covering fiscal years 1951 through 1954.

Aircraft obligations totaled $8.6 billion in FY 1951, reached $13.1 billion in '52, fell off to $11.7 billion in '53, and amounted to only $2.2 billion in fiscal '54.

In contrast, missile obligations rose steadily from fiscal 1951's $275 million to fiscal 1954's $635 million.

Electronic and communications equipment showed a steady decline. From fiscal 1951 through 1954 the totals were as follows: $1.8 billions, $1.3 billions, $660 million, and $314 million. On June 30, 1954, there remained unobligated $3.6 billion for aircraft, $255 million for missiles, and $377 million for electronics.

SIX windows plus an exceptionally wide windshield provide unexcelled built-in visibility and extra travel enjoyment.



Licensed in the utility category, the Beechcraft Bonanza is the only 4-place airplane capable of passing CAA Utility Category Tests at full gross weights, making it the world's *strongest* 4-place airplane. And it's the *fastest*, too—with cruising speeds up to 184 mph—*the ultimate in private air transportation!*

Owners report that there are *101 Reasons* for the Beechcraft Bonanza Superiority. The four thousand time-tested and service-proved Beechcraft Bonanzas *now at work* for business and industry in all of the 48 states and some 50 foreign countries are proof of the Bonanza's design, structural, and high-performance operating efficiency. Here are a few of the NEW Bonanza features for 1955:

A NEW Additional Window on each side provides even greater visibility, greater safety, and greater comfort.

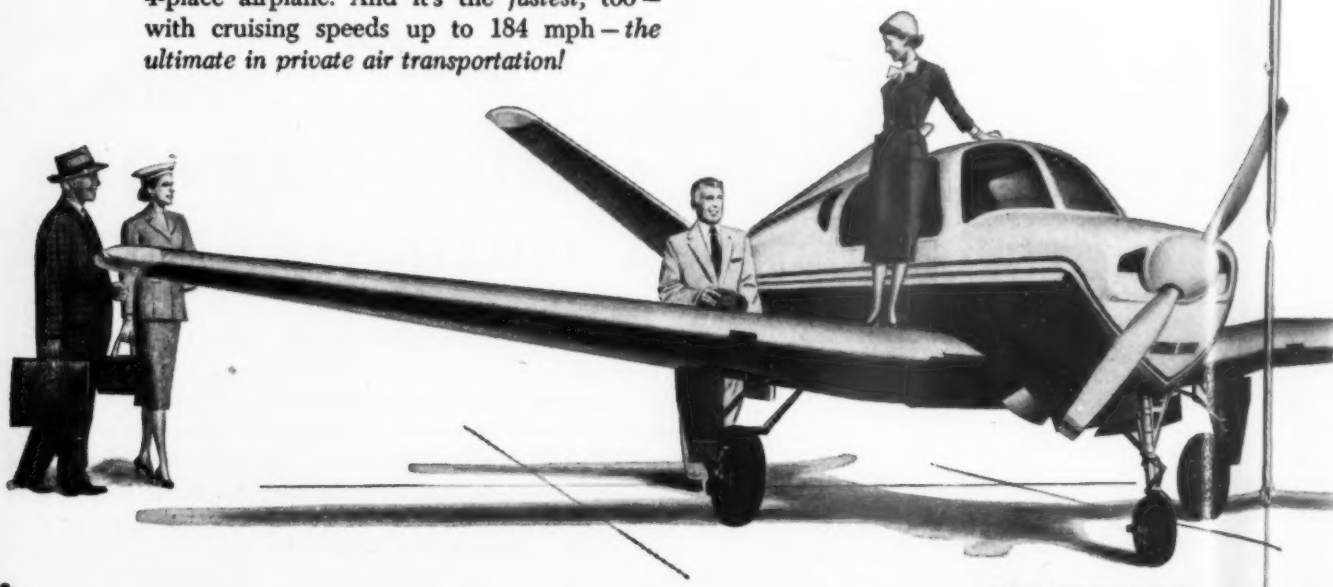
ADDITIONAL Fuel Wing-Tanks, exclusive in the F35 Bonanza, provide ten more gallons of fuel in each wing. When installed, they provide greater range without loss of baggage space.

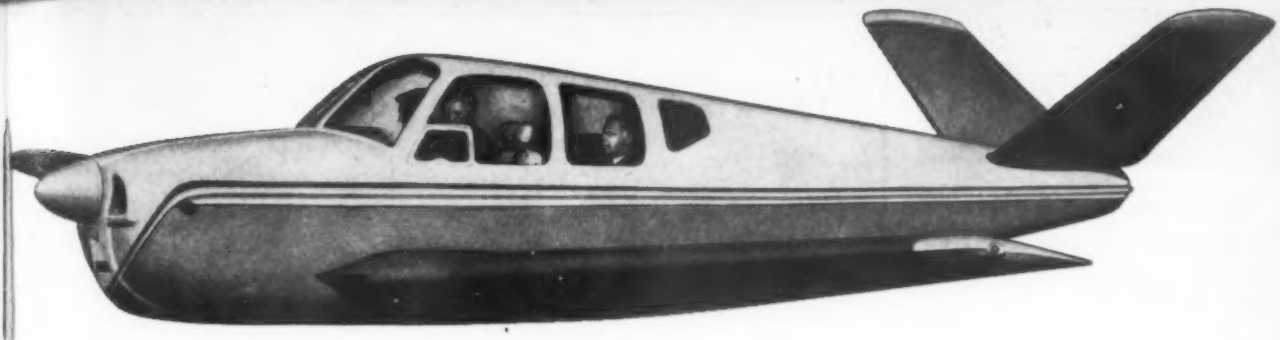
ADDITIONAL Leg-Room for front-seat passengers now available through a special F35 installation.

COMPLETE Exterior Painting is an exclusive standard feature of the Bonanza. The new F35 designs are offered in a wide array of attractive, durable, and easy-to-see colors.

NEW Interior Styling for the 1955 F35 Bonanza provides the ultimate in design, quality of materials and workmanship. Beechcraft's exclusive safety harness furnished standard in harmonizing colors.

NEW Posture-Ease, Adjustable Seats for the Bonanza provide *the tops* in comfort for all passengers.





INSPIRATION FOR BUSINESS

Beechcraft ownership has been the *incentive to immediate action* on thousands of important business deals... getting there quickly... safely... without fuss of reservations... is inspiration for constructive thinking.

On-the-spot consultation may spell the great difference between being *first* or coming in second. Men with the right answers can reach hard-to-get-to locations with *a fast 184-miles-an-hour Beechcraft Bonanza.* They arrive rested, refreshed, and ready for action.

The right man – with the right answer, at the right place, at the right time – lands the contract. *Beechcrafts* enable busy executives to cover every base of activity – and still handle necessary office routine – with more time for relaxation at home, too.

"Easy to buy – easy to fly – easy to service – that's the reason I purchased my Bonanza," Beechcraft dealers are often told by men who make up the Air Fleet of American Business.

Dependence upon outmoded means of executive travel can be costly. Beechcrafts slash your travel time as much as 75 per cent. *You* make *your* own schedules – on *your* map and travel at *your* convenience. Oftentimes it's possible to land your company Beechcraft at the scene of activity, or within minutes of the important business or pleasure destination.

Built to carry efficiently a useful load of 1,053 pounds, the Bonanza offers more miles per hour per horsepower than any other airplane now manufactured for commercial use. This *Beechcraft* is a plane with *earning power.*

ASK ABOUT BEECHCRAFT'S NEW EXCLUSIVE LEASING PLAN.

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

Typical costs, operating data on request from Beech Aircraft Corp., Wichita, Kansas, U. S. A. – or from any of the following Beech Distributors:

Albuquerque—Cutter-Carr Flying Service, Inc.
Amarillo—Tradewind Airport Corp.
Atlanta and Birmingham—Southern Airways Company
Butte—Butte Aero Sales & Service, Inc.
Charleston—Hawthorne Flying Service
Chicago—Butler Airplane Sales
Dallas—J. R. Gray Co., Inc.
Davenport—Elliott Flying Service
Denver—Mountain States Aviation, Inc.
Houston—J. D. Reed Co., Inc.
Indianapolis—Roscoe Turner Aeronautical Corporation
Lansing—Francis Aviation
Lantana—Florida Airmotive, Inc.
Memphis—Memphis Aero Corp.
Milwaukee—Anderson Air Activities
Nashville—Capitol Air Sales, Inc.
New Orleans—Magee Aircraft Co., Inc.
New York City—Atlantic Aviation Corporation
Oakland—Pacific Aircraft Sales Company
Oklahoma City—Aircraftsmen, Inc.
Omaha—C. J. Abbott & Co.
Philadelphia—Atlantic Aviation Service, Inc.
Portland—Flightcraft, Inc.
Rochester, Minn.—Gopher Aviation, Inc.
Rochester, N. Y.—Page Airways, Inc.
Salt Lake City—Kemp & Kelsey Airservice, Inc.
San Antonio—Alamo Aviation, Inc.
Shreveport—Currey Sanders Aircraft Company, Inc.
Teterboro and East Boston—Atlantic Aviation Corp.
Topeka—Topeka Aircraft Sales & Service
Tulsa—Tulsair Distributors, Inc.
Vandalia—Ohio Aviation Co.
Van Nuys—Norman Larson Company
Wichita—Aircraftco, Inc.
Wilmington—Atlantic Aviation Service, Inc.
Youngstown—Youngstown Airways, Inc.

★**G. V. Lea,** UAL. Foreman, San Francisco.

★**W. H. Leland,** UAL. Flight dispatcher, New York.

★**L. H. Reitz,** UAL. Lead line mechanic, San Francisco.

★**E. C. Thomas,** UAL. Station ground services mgr., Burbank.

★**Charles Kingsley,** Grumman, v.p.-and gen. counsel, Bethpage, N. Y.

★**Peter Pinnello,** Pratt & Whitney, mechanic, East Hartford.

★**Joseph Kasek,** Pratt & Whitney, machine operator, East Hartford.

★**Philip Larson,** Pratt & Whitney, experimental assembly section gen. foreman, East Hartford.

★**Clarence Duhring,** Pratt & Whitney, grinder operator, East Hartford.

★**D. E. Nicholson,** AA, flight dispatcher, Los Angeles.

★**J. D. Hungerford,** AA, director, schedules and tariffs, New York.

★**N. G. Peterson,** AA, maintenance foreman, New York.

★**Louis W. Miller,** North American, welder, Los Angeles.

★**John J. Fluck,** North American, gen. mgr. Fresno Modification Center, Fresno.

★**Walt Smeton,** North American, supt.-night operations, Los Angeles.

★**H. A. Stancil,** TWA. District sales mgr., Denver.

★**H. F. Barnes,** UAL. Passenger service mgr., San Francisco.

★**V. S. Burkhart,** UAL. Communications chief, Cleveland.

★**P. E. Coombs,** UAL. Ass't foreman, San Francisco.

★**E. L. Greene,** UAL. Staff ass't, San Francisco.

N. C. Hungerford, UAL. Ass't chief mechanic, Chicago.

★**W. A. Luetzow,** UAL. Accountant, Chicago.

★**L. H. Nelson,** UAL. Lead shop mechanic, San Francisco.

★**T. M. Plunkett,** UAL. Flight dispatcher mgr., Denver.

★**F. G. Belongia,** AA. Senior mechanic, Nashville.

★**Archibald S. Galbraith,** PAA. Latin American Div. supply mgr., Miami.

★**W. D. Auerbach,** UAL. Photographer, San Francisco.

★**D. L. McDaniel,** UAL. Technical training mgr., San Francisco.

★**G. W. Stuart,** UAL. Flight dispatch mgr., Denver.

Galen McFarland, Pratt & Whitney Aircraft. Lathe operator, East Hartford.

Andrew Winzler, Pratt & Whitney Aircraft. Assembly worker. East Hartford.

M. G. Holland, North American Aviation. Director of photographic and reproduction depts., Los Angeles.

Leroy R. Grumman, Grumman Aircraft Engineering Corp. Board chairman, Bethpage, N. Y.

West Coast Talk . . . By Fred S. Hunter

- **Decibel comfort in the 340**
- **Well earned tribute to Rudy Thoren**
- **Industry goes to the country**

THIS IS to take due note of the fact that the cabin sound level of the Convair 340 is on the way down. AiResearch Aviation Service, says Jack O'Brien, produced highly satisfactory numbers in the frequencies above 300 cycles per second in its acoustical treatment on corporate aircraft conversions for American Can and Continental Oil. Pacific Airmotive's Roy Backman reports similar success redoing the interior for an executive ship for Imperial Oil.

AiResearch obtained a seven decibel reduction in the range from 300 to 600 cycles per second, which represents a 50% reduction in sound pressure, and 12 decibels, or 75% in sound pressure, between 2400 and 4800 decibels. Overall acoustic comfort index on these two 340's converted by AiResearch, without silencers on the exhausts, was 52. Index on the Douglas DC-6B, with standard airline interior, is 51. Since the DC-6B seems to be the yardstick by which the industry measures acoustics comfort, O'Brien feels no end pleased with results of the work on the 340.

• •

MEANWHILE, the news from San Diego says Convair is now ready to show off its own sound abatement program, including a new MIT-approved muffler development replacing the noisy augmenter tubes. Convair, so they tell us, intends to show by demonstration that the 340 can be made "quieter than any airplane now being built by anybody." If you detect in this an inference that by "built by anybody" Convair means Viscount, you are more than likely correct.

• •

CONVAIR'S sound abatement project is consolidated with its speed improvement program. In addition to offering operators the opportunity, through kits, to speed up and quiet down their present 340's, Convair expects to resume commercial sales. As a matter of fact, it already has a tentative order or two. This time, however, it will schedule no assemblies on speculation. Convair's commerical production stopped around the first of the year, but it has military 340 production running into 1956. This makes it a simple matter to restore a commercial line whenever enough sales accumulate to turn a profit. Convair indicates it will issue work orders on lots of 10 or more. Price of the faster, quieter Convair 340 will be a bit higher. Something above $700,000.

• •

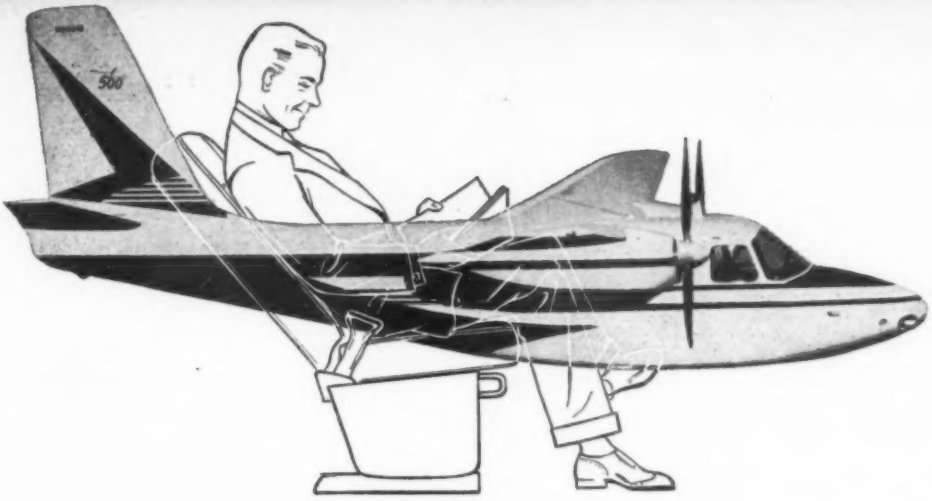
WARREN DICKENSON of Douglas paid this tribute to well-liked Rudy Thoren of Lockheed at a recent Institute of the Aeronautical Sciences meeting: "He's the only man in the industry who organized a flight test department and still runs it after 15 years." . . . Last C-124 will fly away from Douglas-Long Beach before April 15, ahead of schedule. Plane is No. 447 . . . Martin's XB-51, which was the first to have the "T" tail like that now used on the Lockheed F-104 and the tandem-type landing gear like those on the Boeing B-47 and B-52, is still flying for the Aberdeen Bombing Mission at Edwards Air Force. It has three J-47 engines, two in wing pods, one in the tail.

• •

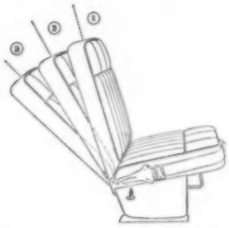
WHEN FRANK TALLEY and Norm Nicholson get their new plant built up in Ventura County, a visit to the Talley Machine & Manufacturing Co. will be like a day in the country. It's located on the corner of a ranch. An ideal location, avers Talley, whose present plant is smack in the heart of the smog belt on Los Angeles' teeming east side.

• •

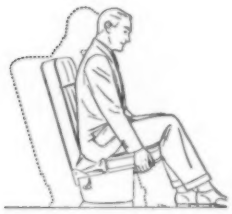
J. F. (SKEETS) COLEMAN, the famed VTO pilot, is now the proud (?) owner of a Seabee. Recently visited Shrevesport, La., with it. For further details, contact Skeets personally.



SEATING COMFORT *IN THE NEW AERO COMMANDER 560*



Individual chair backs adjust to three comfortable positions.



Chairs adjust fore and aft for added comfort —leg room.

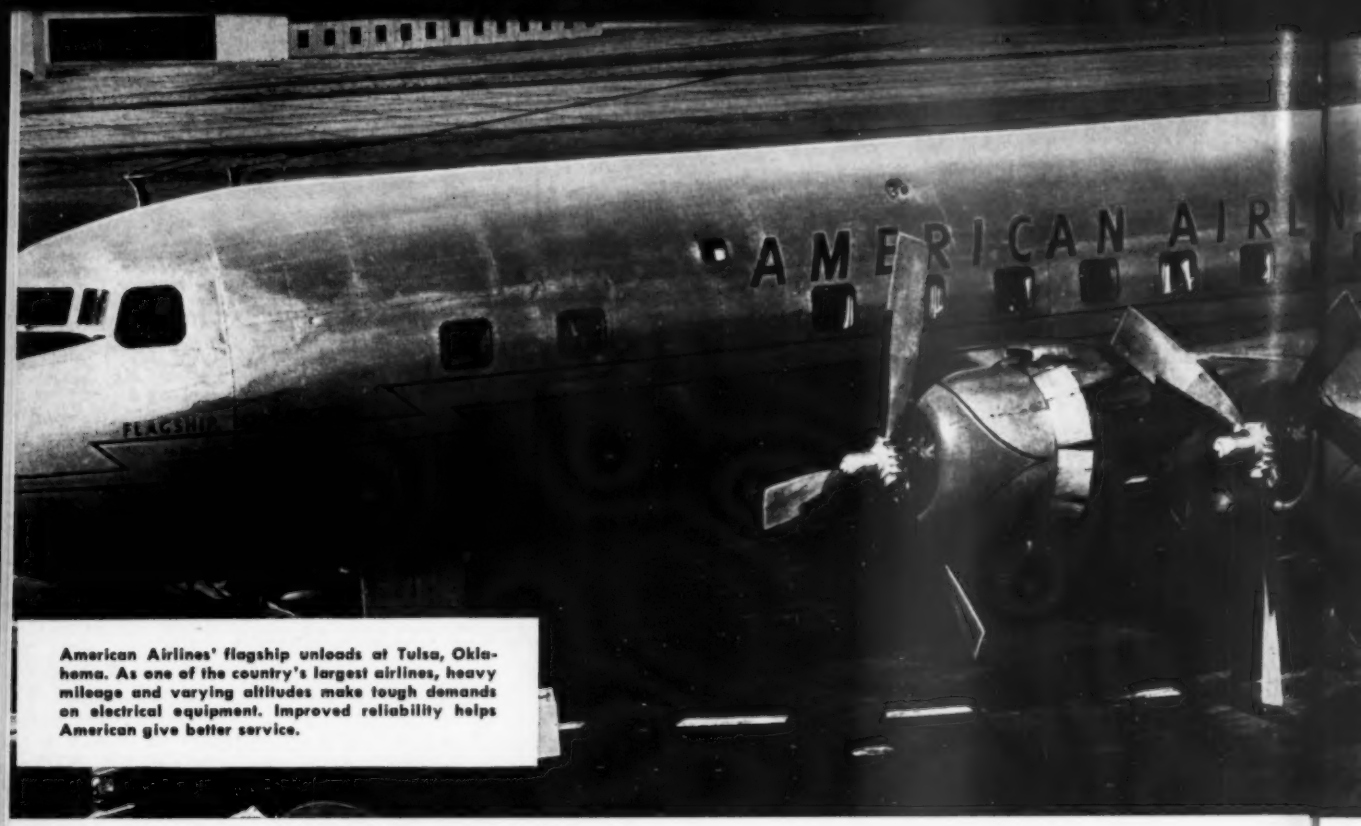
The restful comfort of individual by-the-window seats in the new Aero Commander 560 greatly enhances the pleasure of air travel. Seating comfort is typical of the way in which this 5-7 place twin-engine executive airplane anticipates the exacting requirements of the flying executive.

WRITE DEPT. 129 FOR NEW CATALOGUE

AERO DESIGN Commander 560

AERO DESIGN AND ENGINEERING COMPANY • TULAKES AIRPORT • P. O. BOX 118 • BETHANY, OKLAHOMA

Circle No. 16 on Reader Service Card.



American Airlines' flagship unloads at Tulsa, Oklahoma. As one of the country's largest airlines, heavy mileage and varying altitudes make tough demands on electrical equipment. Improved reliability helps American give better service.

G.E. HELPS AMERICAN BOOST AIRCRAFT

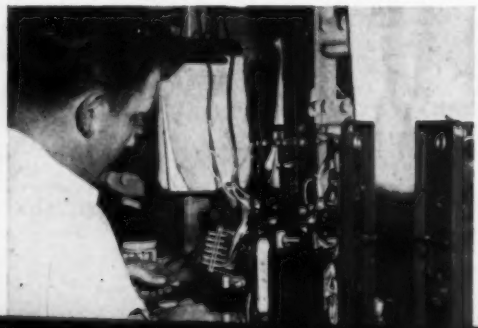
Part of American Airlines' overhaul base at Tulsa, Oklahoma, shows DC-6 hangar. G.E. works here with airline's engineers to improve service life of equipment.

Sitting in co-pilot's seat, American project engineer removes generator control panel in Convair. Maintenance is facilitated by easy removal of generator protective devices which are grouped in G-E load-center units.

G-E representative discusses generator installation with American project engineer. Average total generator life is about 12,000 hours. Some last 18,000 hours.

G-E 300-amp generator is prepared for operational check before installation on aircraft. New brush design can withstand effects of sea level and high altitude.

Convair generator control panel undergoes overhaul in American's accessory shop. To further increase electrical system's reliability, all of American's Convairs are equipped with a G-E generator protective system.



G-E aircraft representative C. M. Gordon discusses success of electrical improvement program with E. H. Raiguel, Director of Aircraft Engineering, American Airlines.

GENERATOR SYSTEM LIFE 100%

Power systems on Douglas DC-6's and Convair 240's give increased life between overhauls — maintenance time on other G-E components reduced

American Airline engineers, with the help of General Electric, have increased aircraft generating system life on their Douglas DC-6's and Convair 240's 100%. The systems were installed in 1946. For example, the expected generator life between overhauls of 700 hours on the DC-6's has been boosted to 1800 hours. This increase is the result of American's effort to extend its aircraft electrical component life between overhauls to keep pace with its engine overhaul schedule.

How equipment life, performance were improved

Longer generator life has been brought about three ways:

(1) Spline wear has been reduced while keeping adequate damping of torsional vibrations.

(2) Bearing failures have been diminshed by supplying a special shielded type that will not rotate in its housing.

(3) An entirely new type brush has been developed that will perform equally well at both high and low altitudes.

The original components such as the reverse current relays and reverse current breakers have given American long hours of low-maintenance service. In addition, co-operative efforts between G.E. and American have resulted in over-all system improvements such as over-voltage protection at minimum cost.

How American Saves Dollars

E.H. Raiguel, A.A.'s Dir. of Aircraft Engineering states, "Reliability and low maintenance cost of G-E aircraft electrical equipment mean dollars to American Airlines." This reliability and low maintenance is a result of careful systems engineering and sound equipment design which have been brought about by a continuous co-operative effort among American, G.E., and the airframe manufacturers.

How G.E. Helps American

Early in 1947, American inaugurated service with Douglas DC-6's, and later, with Convair 240's. Naturally, they placed high value on the reliability of their electrical equipment. G.E. co-operated closely with them and the airframe builders in working out the details of the system.

This co-operation did not end with the delivery of the equipment. Since that time, General Electric has been working continually with American's engineering staff at Tulsa, Oklahoma, to improve the equipment's ability to withstand tougher environmental conditions and varying operational demands. The success of this program was a main reason for American specifying G-E equipment on a new order of DC-6B's and again last year when they ordered DC-7's.

Service Available to You

The story of General Electric's co-operative improvement program with American is being repeated with many of today's major U.S. airlines. G-E application and service engineers are ready to work with you in both design and development of your aircraft equipment needs. For further information, see your nearest G-E Apparatus Sales representative. General Electric Co., Schenectady 5, New York.

210-94

Progress Is Our Most Important Product

GENERAL ELECTRIC

ALPA hears safety needs:

Harness, Helmets & Information

BY WALTER A. KILRAIN

FORTHCOMING JET AND TURBOPROP transports, with their higher approach and landing speeds, will mean greater exposure to accidents, and accidents will increase as a result, safety expert A. Howard Hasbrook told the Air Line Pilots Assn. earlier this month. Despite this the safety record will improve, since the accident rate per passenger mile will probably continue to diminsh, predicted Hasbrook, director of Aviation Crash Injury Research.

• **Crash helmets** and shoulder harnesses for transport flight crews were urged by Hasbrook in his speech before ALPA's third annual air safety forum, held in Chicago. "The cockpit, unfortunately, does not lend itself to de-lethalization, due to the nature of the beast," he said. "A major increase of safety for the crew can, however, be achieved by preventing the crew from striking lethal objects in the cockpit . . . Since a major portion of . . . military accidents [in trainers and fighters] involve ground contact speeds similar to the approach and landing speeds of modern transport aircraft, shoulder harness would be just as beneficial to civil transport crews as it is to military pilots."

A new type of harness, developed by Crash Injury Research, was described by Hasbrook, who declared that it apparently did away with one of the major defects in present designs: discomfort and restrictiveness. The new harness, with only 14 pounds pre-loading rather than 15 can be easily and quickly removed after take-off, if the pilot chooses, without unbuckling the safety belt.

• **Need for a crash helmet** will increase with the advent of jet and turboprop transports, Hasbrook predicted.

• **Turbulence also drew attention** as the cause of the greatest number of accidents during 1951-1953, in scheduled domestic service. W. K. Andrews, director of the Bureau of Safety Investigation, Civil Aeronautics Board, presented a report on the frequency of various accident causes, and an analysis of the accident record of transports related to the number of hours flown.

"It is not necessary for me to remind this group that turbulence in flight is not to be taken lightly," said Andrews. "However, the installation of airborne radar on some equipment has much promise."

Following turbulence in frequency of accidents caused was collapse of landing gear, overshooting, collision with ground or water, wheels-up mishaps, and fire in flight. No fatalities occurred as a result of the last, mainly, said Andrews, because of the pilot's skill.

Crash Injury Research

NEW HARNESS features quick-attach design.

The record of various transport types, in accidents per hours flown, is shown in the table.

• **The importance of incident** reports is growing as the accident record improves, yet pilots are afraid that they will bring disciplinary action down on their heads if they report near-accidents, the meeting was told. The answer, suggested Jerome Lederer, director of the Flight Safety Foundation, may be in an automatic monitoring system which would record altitude, track and speed during the flight.

"Suppose a pilot has been making approaches in dangerous terrain in bad weather without following established practice," he went on. "He continues to feel very satisfied with his ability. But suppose there was some device that later showed that in, say, one in every five approaches he was brushing dangerously close to an unseen mountain. The incident had been reported before the accident occurred. He would stop the dangerous procedure."

Such a monitor should be used with pilot consent, said Lederer, with pilot identification omitted. In order to secure pilot cooperation, some means must be found to cope with the legal problems of self-incrimination. "The industry has solved other difficult problems," Lederer concluded. "Why not slay the legal spector in accident investigation and incident reporting so that accidents can be prevented by the free sharing of experience and knowledge?" • • •

How Transports Compared in Accident Rates

Scheduled Domestic Passenger Operations, 1951-1953

(Aircraft in Excess of 12,500 Pounds)

Aircraft	Revenue Hours Flown	Percent of Total	Accident Rate Per 100 Thousand Hours		
			Fatal	Non-Fatal	Total
DC-3	2,567,734	36.8%	0.16	0.90	1.05
DC-6	1,026,095	14.7	0.29	0.78	1.07
DC-4	818,328	11.7	0.12	1.96	2.08
CV-240	674,755	9.7	0.30	2.40	2.70
M-404	382,261	5.5	0	1.30	1.30
L-749	317,689	4.6	0	1.00	1.00
DC-6B	312,883	4.5	0.64	0.96	1.60
L-49	306,673	4.4	0	1.30	1.30
CV-340	141,690	2.0	0	1.40	1.40
L-1049	124,449	1.7	0	4.00	4.00
M-202-202A	93,835	1.3	1.07	4.30	5.37
L-18	87,277	1.3	0	0	0
B-377	67,182	1.0	0	0	0
L-649	39,778	0.6	0	0	0
DC-3S	9,107	0.1	0	0	0
DC-7	1,204	0.05	0	0	0
L-1049C	1,146	0.05	0	0	0
Totals	6,972,086	100%	0.19	1.30	1.49

NOTE: Excludes propeller accidents to persons on ground.

Source: Bureau of Safety Investigation, CAB.

NEW AND OLD research aircraft at Edwards AFB. Modified Boeing B-47 and rocket-powered Douglas D-558-II show typical "needle noses."

CAMERA EQUIPMENT (optigraph) atop B-47 fuselage records motion of small lights on wing and tail. Above, calibration before flight.

B-47 Being Tested by NACA

WHAT MAY BE the most complete study of an airplane's performance ever conducted is under way at Edwards Air Force Base, where a modified Boeing B-47 is being put through a test program by the National Advisory Committee for Aeronautics.

A long boom on the nose of the B-47 picks up data on angle of attack, airspeed, and angle of yaw; a streamlined housing on top of the fuselage just behind the cockpit encloses a camera for observation of the wing and tail; and 500 fine-wire strain gauges throughout the plane record stresses experienced during maneuvers. The bomb bay stores rows of oscillographs, which record the instrument readings. During the typical two-hour research flight the instruments put 70 miles of data on film, and use enough energy to supply the average household for a week.

NACA research centers at Moffett Field, Langley Field, and Edwards AFB contributed suggestions for the research program, which will involve a variety of maneuvers at different speeds and at altitudes between 5000 and 35,000 feet. Performance while flying through gusts and data on tail design form the core of the study.

The B-47 was chosen because its swept wing has already been the subject of extensive study, and because as a relatively flexible airplane it is particularly interesting to aircraft designers.

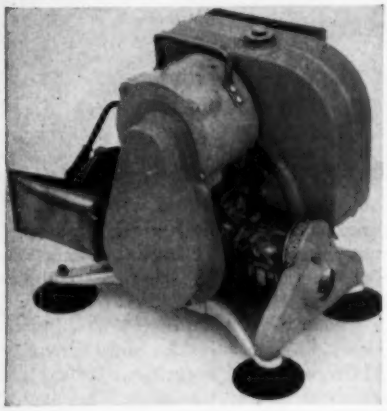
DATA IS RECORDED by rows of oscillographs mounted in the B-47's bomb bay, as well as on other instruments installed by NACA.

MODIFIED NOSE keeps record of airspeed, yaw, angle of attack. Flights are made by pilots from NACA High-Speed Flight Station.

New Products and Processes

Auxiliary Power

A lightweight, portable electric generator designated the Model 5900-B has been developed by Lear, Inc. The unit includes a gasoline engine, weighs approximately 30 pounds, and supplies

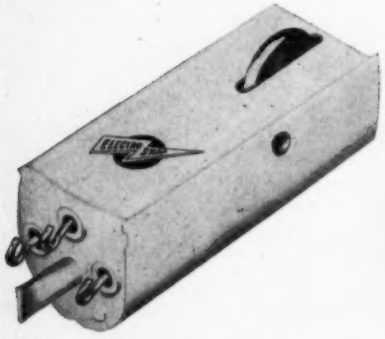


26 volts DC at 50 amperes continuously. A carrying handle and suction-cup feet are features of the design. Fuel consumption is reported to less than half a gallon per hour. The unit is designed to be carried aboard aircraft and used in ground applications around airports.

Circle No. 60 on Reader Service Card.

Rocket Switch

A switch designed to ensure that retractable rocket trays are not brought back into the aircraft with misfired rockets still in them has been put into production by Electro-Snap Switch & Mfg. Co. The switch prevents retraction of the tray until a movable roller is free to project from the housing (see photo), indicating that the rocket has been launched.

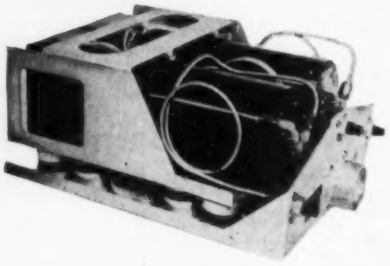


Operating mechanism is sealed in an inert gas, and an hermetic seal provides for dependable operation under widely varying environments. Length of housing of Model HS-25 is 2 27/32", weight is three oz., operating force three lbs.

Circle No. 61 on Reader Service Card.

Pressure Ratio Indicator

The ratio of pressure at the tailpipe of a jet engine and at its inlet is revealed to the pilot by pressure ratio indicators developed by the Kollsman Instrument Corp. The instrument will be incorporated in the McDonnell F-101



twin-jet fighter for use during pre-take-off engine checks and while determining optimum power settings for cruise and climb.

Both remote-indicating and direct-reading types are made. The latter involves bringing tubing to the cockpit, but is lighter in weight.

Circle No. 62 on Reader Service Card.

Spark Plug Tester

AC Spark Plug Division of General Motors has announced commercial production of a new instrument that checks the electrical performance of both jet and reciprocating engine spark plugs.

The AC device, already tested and adopted by the U. S. Air Force, will detect insulator cracks, flaws and other imperfections. It also determines if a spark plug insulator will withstand electrical potential in excess of 20,000 volts without rupture or breakage—simulating the flashover voltage of a plug in operation.

Feature of the tester is an oil quench in the gap area. This prevents high voltage discharge across the gap and reveals insulator tip discrepancies. No other known tester indicates these flaws, AC says.

Circle No. 63 on Reader Service Card.

Vibration System

The MB Manufacturing Co. has introduced a new system for vibration excitation of aircraft and guided missiles. It is built around two MB Model S6 exciters which develop up to 150 pounds force.

According to MB officials, a typical aircraft test could be conducted by mounting as many as 200 pickups in

and on the structure. The exciters, attached to such points as wing tips, nacelles, stabilizers and flaps, would convert electrical power into vibratory mechanical force.

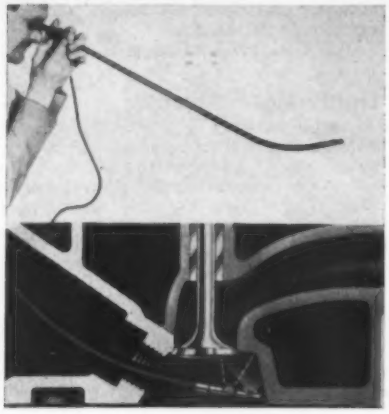
Circle No. 64 on Reader Service Card.

Inspection Aid

A controllable mirror that can be adjusted to sweep an area under inspection or to focus on a particular spot is featured in a new aircraft inspection device marketed by Eder Instrument Co.

Called the Eder Inspectroscope, it uses a strong light bulb to illuminate the interior of the chamber under inspection. The patented controlled mir-

ror is said to allow examination of areas

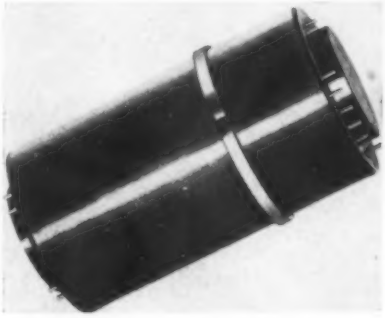


which cannot be viewed with other models.

Circle No. 65 on Reader Service Card.

New Gyro

Gyroscopics, Inc., has announced development and pilot production of a newly designed H I G-5 Gyro which is lighter, and more sensitive, and has greater reliability than existing units.



The new design is interchangeable with earlier models and features low drift rates as well as a 5-minute warm-up time.

Circle No. 66 on Reader Service Card.

Speed Control

General Electric Co. Specialty Control Dept. has announced availability of a new Thy-Mo-Trol automatic electronic control for d-c motor drives featuring use of printed circuitry. New design is available in two ratings: ¾ to 1 hp, and 1½ to 3-hp, full wave.

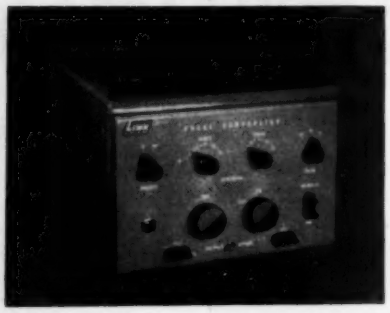
Circle No. 67 on Reader Service Card.

Phase Comparator

Link Aviation, Inc., has developed a new phase comparator designed specially for computer work where phase shift is a critical factor. It permits precise measurement of phase relationship of in-phase and out-of-phase voltages. Measurement of input voltages with

Circle No. 17 on Reader Service Card. ⟶

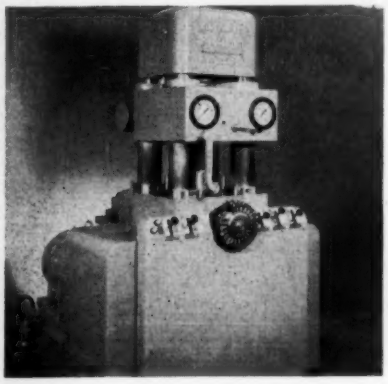
the Link Model 201 comparator ranges from 1.0 to 120 volts through the frequency range of 60 to 400 cycles.



Circle No. 68 on Reader Service Card.

Hydroform Machine

A new 8" Hydroform capable of forming parts from sheet metal blanks up to 8" diameter and maximum draw depth of 5" has been unveiled by The Cincinnati Milling Machine Co. It is said to handle virtually all metals in gauges up to ¼" steel.



The new machine weighs 12,000 pounds and requires only water and electrical connections for operation. Floor base dimensions are 5' x 5' and height 7½'.

Circle No. 69 on Reader Service Card.

Foam Plastic

Bakelite Co., Div. of Union Carbide and Carbon Corp., has unveiled new lightweight plastic materials called syntactic foams for use in sandwich-type structures. Types ranging in density from 10 to 14 lbs. per cubic foot are being tested for use in stiffening hollow aircraft wing structures, the manufacturer says.

Low cost structures using syntactic foam cores between glass fiber mats reinforced with polyester resins reportedly show flexural strengths from 1700 to 4500 psi, tensile strengths from 1600 to 2900 psi, and compression strengths as high as 12,100 psi. Literature available.

Circle No. 82 on Reader Service Card.

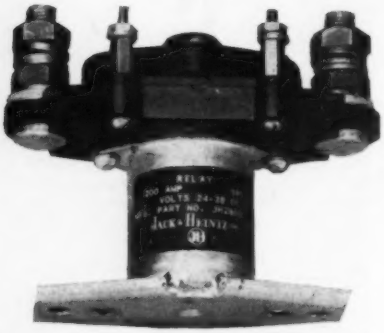
Metering Valve

A new 2.6 lb. anti-g suit metering valve that fully qualifies under Spec. MIL-V-9370 is being marketed by Gladden Products Corp. The company has also announced a new MD-1 pressure regulating valve for anti-g suits featuring swivel fittings at inlet and outlet connections for ease of installation in close uarters.

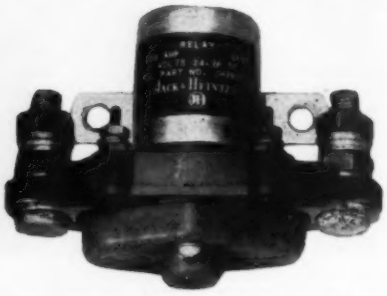
Circle No. 83 on Reader Service Card.

D-C Relays

New 200-ampere d-c relays developed by Jack & Heintz, Inc., for high current switching in 28 volt d-c aircraft systems are rated for continuous duty and weigh 1.25 pounds.



Types JH28007-1 and -2 relays are both SPST designs differing only in mounting provisions. They operate on nominal coil voltage of 24 - 28 volts with a 29 volt maximum. Dimensions are 4.5" x 3.75" x 2" overall.



Circle No. 70 on Reader Service Card.

High-Altitude Inverters

Production of two new three-phase aircraft inverters capable of delivering full-rated load at altitudes of 50,000 ft. and at least half-rated load to 60,000 ft. has been disclosed by Jack & Heintz, Inc.

The two models are the F138-1, a 1500 va inverter and the F148-1 rated at 2500 va. Both are self-cooled designs which attain high-altitude performance by utilization of large commutators with staggered bellows to allow unrestricted internal airflow and overcome the affects of severe heating at high altitudes.

Circle No. 84 on Reader Service Card.

Test Stand

Bone Engineering Corp. has developed a new precision fuel flowmeter test stand for calibrating transmitters in the range from 100 to 12,000 lbs. per hour flow.

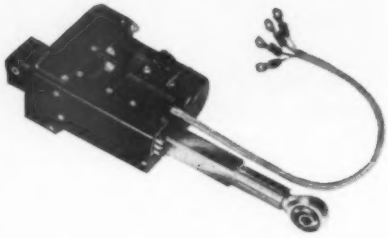
An Air Force development, the Bone Model 350 stand is designed to check units against a measured weight of fuel in an interval of time as well as for comparison testing wherein a transmitter is compared with a calibrated standard. Reported weighing system accuracy is ±0.3% of indicated reading at all points.

Circle No. 85 on Reader Service Card.

Lightweight Actuator

John Oster Manufacturing Co., Avionic Div. has introduced a new 1.40 pound linear actuator for aircraft and automatic control systems said to be 25% lighter than units of comparable performance.

The type ACT-3090 actuator features a gear train and motor that are "blended" into a single homogeneous unit by developing "exact" equations. Maximum end-play is less than 0.0018" in the screw and nut.



Circle No. 71 on Reader Service Card.

Flexible Connector

A new flexible fluid connector marketed by Arrowhead Rubber Co. for aircraft fuel and oil systems is made from rubber impregnated fiberglass. It is cured under 2000 psi pressure to fuse the layers of fiberglass and rubber into a strong integral tube capable of handling aromatic fluids such as MIL-H-3136 Type I or III.

The tubing is designed to withstand extreme flexing and vibration without failure. It can also be adapted for installation through aircraft engine firewalls or in fire zones.

Circle No. 72 on Reader Service Card.

Safety Belts

New airline-type safety belts produced by Rusco Aero Products and

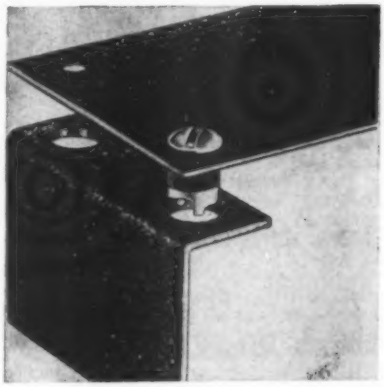
marketed by Van Dusen Aircraft Supplies feature a quickly detachable buckle for ease in cleaning. The new design uses a spring tension buckle and

is available with end-fittings of three types; the quick-detach, the fixed, and the three-bar adjustable slide.

Circle No. 73 on Reader Service Card.

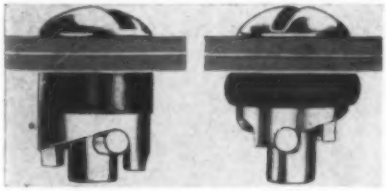
Floating Fastener

The General Tire & Rubber Co., Industrial Products Div. will produce and market a new quick-acting fastener



that serves the added role of a vibration isolator. Called "Vibrex," the new unit is floated in live rubber to suppress noise and vibration.

The Vibrex fastener locks in metal,



plastic, glass or composition board. A simple half turn of a screw slot expands the rubber body of the fastener permitting it to lock in a plain hole without requiring a separate receptacle. The resulting attachment is said to be waterproof, dustproof, and pressureproof.

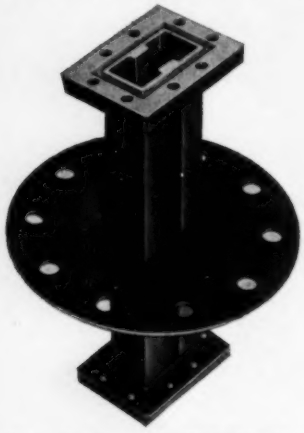
Circle No. 74 on Reader Service Card.

Waveguide Bulkhead

A new ridge waveguide bulkhead assembly for use with either C-Band or X-Band commercial airborne weather

radar had been developed by Airtron, Inc. It is primarily designed for passage of waveguides through pressurized bulkheads where no air leakage is allowed.

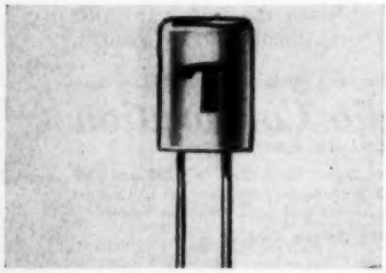
The new unit consists of a waveguide section with a circular plate brazed radially to its center. A retaining plate of the same diameter is used to bolt the waveguide plate fast to the bulkhead with an intermediate rubber gasket providing the airtight seal. Electrical characteristics are said to be equivalent to those of a straight double-ridge waveguide section.



Circle No. 73 on Reader Service Card.

Diodes-Rectifiers

Immediate availability of silicon junction diodes and power rectifiers has been announced by Transitron Electronic Corp. The diodes are designed primarily for signal magnetic amplifier and power supply use in high temperature operation up to 150°C.

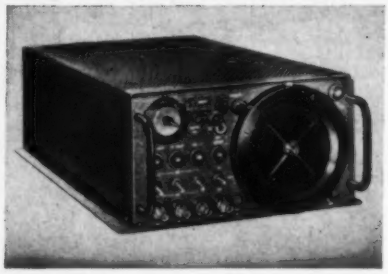


The new silicon power rectifiers are rated for continuous operation at full rated power under ambient temperatures of 125°C. Types are available for both magnetic amplifier and power supply applications.

Circle No. 76 on Reader Service Card.

VHF Direction Finder

A new low-cost VHF automatic direction finder introduced by Olympic Radio & Television, Inc., is said to have a receiver accuracy within 1° and overall system accuracy slightly lower. It reportedly will sell for about $3500 including receiver-indicator, antenna, mast and cables, which the manufacturer states is considerably less than half the cost of a comparable system.



Weight of the VHF-DF equipment is slightly over 160 pounds. Power consumption of the combined receiver-indicator, hazard light and motor is 245 watts.

Circle No. 77 on Reader Service Card.

Self-Sealing Screws

New threaded fasteners marketed by Aero Bolt & Screw Co. utilize the principle of sealing the mating surface to the head of the fastener instead of the usual sealing of thread or shank areas. The new ABSCO screws employ standard AN or MS "O" ring and groove arrangement for sealing.

To overcome the problem of friction between the seal ring and fastener, the new design uses a thin teflon washer that permits the rubber to flow evenly in all directions. All popular head types are available including countersunk models.

Circle No. 78 on Reader Service Card.

Axial Blower

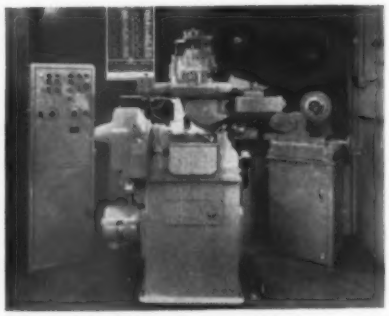
Use of miniature motors originally developed for high speed aircraft and guided missiles has made possible the design of a new compact axial flow blower, according to its producer, Air Equipment Co. It measures only 2" in diameter by 3" long and produces 60 cu. ft. of air per minute at less than 1 ampere draw.

Feature of its design is the use of an impeller nose spinner to provide more effective blade area. This results in a marked reduction in noise while considerably increasing air flow. Motor can be powered by either d-c or 400 cycle a-c current.

Circle No. 79 on Reader Service Card.

Gear Grinder

A new precision gear grinder designed to meet the needs of jet aircraft and engine manufacturers is marketed by Belock Instrument Corp. It reportedly can be made ready for a given job within one hour at the maximum, compared with several hours of preparation required by other methods before actual gear generation starts.

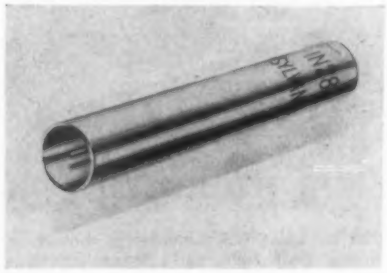


The Belock "pocket size" grinder has a 3' by 4' base and weighs 2700 pounds.

Circle No. 80 on Reader Service Card.

Silicon Diode

A new silicon crystal diode unveiled by Sylvania Electric Products, Inc., Electronics Div. is designed for such applications as tunable frequency radar systems and counter-measures devices. The 1N286 diode is a broad-band coaxial point-contact type covering the frequency band from 10,000 to 20,000 megacycles.



The Sylvania device is intended for use as a crystal mixer. With the crystal holder made in WR-75 waveguide, the band of frequencies from 10,000 to 15,000 mc can be covered. When used in WR-51 waveguide, frequency coverage is 15,000 to 22,000 mc.

Circle No. 81 on Reader Service Card.

Technical Literature

EXPLOSION SUPPRESSOR. An 8-page booklet by Simmonds Aerocessories, Inc., describes its aircraft fuel tank explosion suppression system.

Circle No. 85 on Reader Service Card.

ELECTRICAL POWER. Components of electrical systems and the facilities needed to produce them are discussed in a 31-page booklet (B-6392) published by the Westinghouse Electric Corp.

Circle No. 86 on Reader Service Card.

TUBING. Chemical analyses of standard steel tubings used for high temperatures and pressures are provided in a folder (TDC 177) by the Babcock & Wilcox Co.

Circle No. 87 on Reader Service Card.

JET ENGINE SERVICE. A 16-page picture story reviews maintenance service of jet engines in a General Electric bulletin (GEA-6136).

Circle No. 88 on Reader Service Card.

CLEANING PRODUCTS. A 20-page catalog of various cleaning agents, in tabular form for easy reference, has been published by Turco Products, Inc.

Circle No. 89 on Reader Service Card.

FACILITIES. The organization and facilities of Cook Research Laboratories are described in a 72-page brochure (R-14). The firm engages in research and development on electronics, missiles, human engineering, and other allied subjects.

Circle No. 90 on Reader Service Card.

MAGNETIC AMPLIFIERS. Theory, applications, and characteristics of magnetic amplifiers for control are described in a 20-page booklet (Tech. Data 52-600) by Westinghouse Electric Corp.

Circle No. 91 on Reader Service Card.

FOR THE LAYMAN. Simplified explanation of various types of jet engines, titled "Tinkering with the Turbine," has been prepared by Capital Airlines. Briskly written and illustrated.

Circle No. 92 on Reader Service Card.

FACILITIES. The engineering divisions of Stromberg-Carlson Co. and their fields of activity in electronics are described and extensively illustrated in a 36-page booklet (3-55-CH).

Circle No. 93 on Reader Service Card.

GERMANIUM DIODES. Ratings and characteristics of germanium diodes are tabulated by the Internatl. Rectifier Corp. in a new leaflet (GD-2).

Circle No. 94 on Reader Service Card.

SYNCHRONOUS MOTORS. Over 125 hysteresis and salient pole induction synchronous motors are described in a 24-page brochure (EI-4A) published by the Electric Indicator Co., Inc.

Circle No. 95 on Reader Service Card.

FIRE SUPPRESSION. The principles and types of fire and explosion suppression systems are described in an 8-page leaflet (AD-372) by Simmonds Aerocessories, Inc.

Circle No. 96 on Reader Service Card.

CONSTRUCTION. Illustrated brochure cites some of the construction jobs, including jet test facilities, successfully accomplished in the California area by the Southern Engineering & Construction Co.

Circle No. 97 on Reader Service Card.

Maintenance Bulletin Board

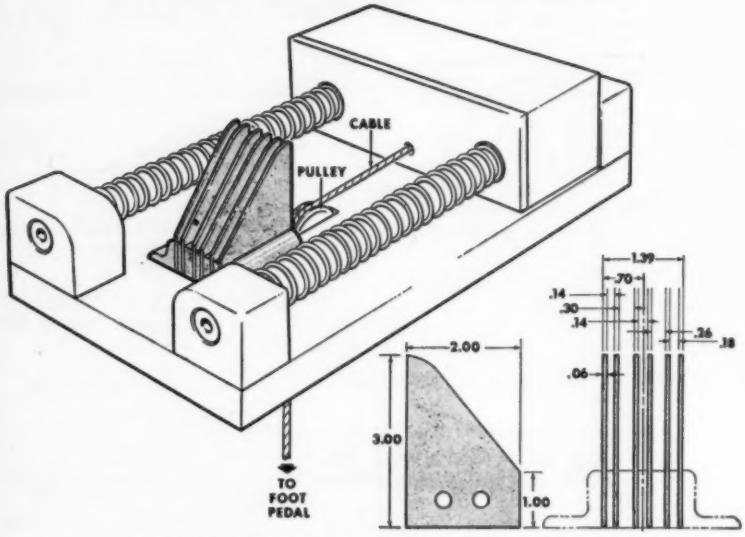
Martin Metal Eraser

A small tool developed at The Glenn L. Martin Co. actually "erases" scratches in aluminum sheet. It is made from a common ball bearing which is secured to a rod for use in a power drill.

The revolving ball is passed over the damaged skin using a light oil as a lubricant. Martin has found that it does a better burnishing job than older hand burnishing methods and saves 38% of the time required.

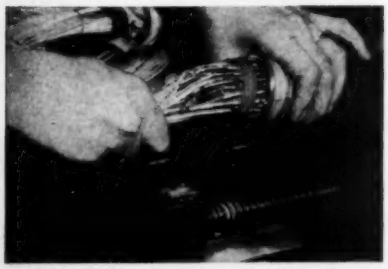
Ball bearing erases metal scratches.

Convair Vise Cuts Wire Damage



Sketch shows operating principle of Convair connector vise.

Convair-Ft. Worth is using a new viselike tool that not only speeds the seating of aircraft electrical connector grommets but is producing a better quality job. Before its development, the humidity, vibration and cable-clamping grommets that go to make up today's high-environment connectors were forced in place by hand and rejections due to broken conductor insulation and torn grommets were numerous.



Parallel metal plates fit majority of connectors.

John V. Grotty, Convair electronics group engineer then came up with the idea of a foot operated vise which will draw the grommets into place and still leave the operator's hands free to protect against wire or grommet damage. Parallel metal plates which form the front jaw of the device are common to a large majority of connector contact arrangements and the operator merely fits the wiring harness into the plates before the assembly operation.

NAL Adopts New Compressor

A new home-made valve spring compressor developed by National Airlines and now in use in its Miami engine overhaul facility has doubled shop output over previous hand tool methods. It uses a standard shop air line combined with a war surplus "shotgun" aircraft starter to pneumatically compress valve springs on all engines up to new Wright Turbo Compound types.

Using the standard manufacturer's hand tool NAL could handle valve spring and valve installations on one engine set of cylinders a day. With the labor saving advantages of the new compressor two engine sets are now being produced.

Mechanic compresses valve springs on Turbo Compound cylinder.

Dust Storm Warning

Southwest Airmotive Co. estimates that each spring and summer it overhauls an average of four engines as the result of sand entering air intakes and causing cylinder and ring damage. Evidence of such damage usually takes the form of ring oil blow-by visible in the crankcase breather.

Warns SAC's W. J. Connell, superintendent of aircraft overhaul, after exposure to dust storm sands either on the ground or in flight, engine oil should be changed as quickly as possible, oil screens checked and the engine washed down.

Shaped Charges Give Rocket Flexibility

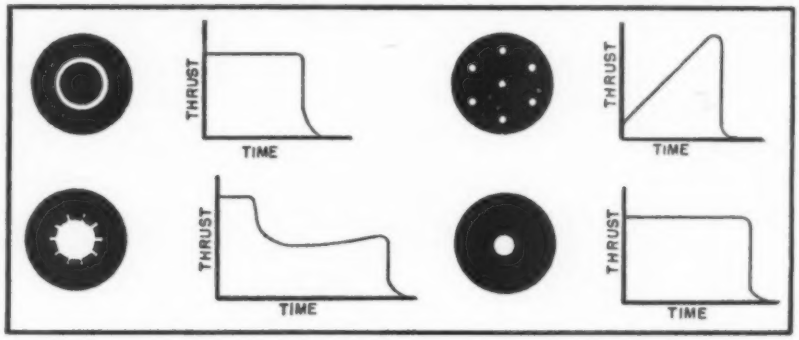
THE PRACTICAL DEVELOPMENT of shaped charges has given the solid rocket engine used for JATO or as a booster or straight rocket new flexibility which promises great things for the once inflexible powerplant, according to H. W. Ritchey of Thiokol Corp. It is now possible to program the thrust of solid rocket engines over a wide range, Ritchey told the Institute of the Aeronautical Sciences during its recent New York meeting.

Each of these solid rocket applications bears close resemblance, and although several methods have been used to differentiate between the applications, Ritchey said, the most effective method is "the velocity achieved by the device at the end of the burning period" (see graph). JATO falls in the rocket category, having velocities of 100-400 feet per second; boosters are in the 300-1000 feet per second class; single-stage rockets are in the 600-5000 feet per second class.

Like most technical developments, advances in solid rocket techniques which provide thrust programing bring with them elements of complexity. The introduction of shaped charges introduces more complex combustion problems and requires new approaches to charging the rocket cylinder with its fuel. Even so, the solid rocket is still a relatively simple unit.

•**Initially,** solid rockets consisted of the steel outer housing or pressure shell, a nozzle throat, and expanding cone. Into this simple container was inserted the propellant grain or fuel, usually isolated from the housing by some type of inhibitor. The inhibitor covered all but the end surface of the cylindrical charge designed for burning and was used to isolate the outer housing from the high heat of combustion. The unprotected end faced the nozzle throat, and burning progressed uniformly rearward of this face at a constant rate depending on the propellant and the combustion pressures.

HOW SHAPED CHARGES provides flexible thrust patterns.



This process produced constant thrust output for the entire burning period of the rocket engine.

•**By simply using** a concentric hole along the full length of the charge, Ritchey noted, thrust levels were radically changed. In this approach both ends as well as the cylindrical sides were coated with inhibitor. Burning was thus limited to the surfaces of the concentric opening. At the start of combustion the thrust level was at its minimum value. As burning progressed the circumference of the opening constantly increased, providing more and more burning surface and higher thrust levels.

Thus the change in burning surface provided thrust programing from a minimum to a maximum value.

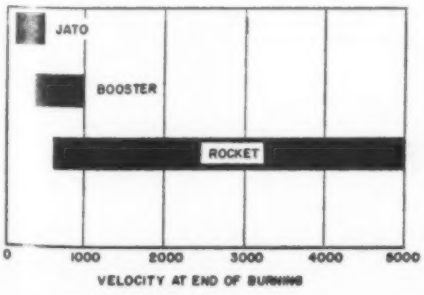
•**Logical refinements** in this arrangement have opened new possibilities. By using star, gear, cog-shaped burning surfaces (see drawing), virtually any level of thrust programing is possible. These can be arranged so that the surface of the stars at the center, where burning begins, is very large, and initial thrust is very high, gradually decreasing as the combustion progresses toward the outer shell, or vice versa.

Shaped charges can be varied to give a high initial thrust level, gradually dropping off, then increasing again in the final seconds of operation.

Discussion following Ritchey's paper brought out that rocket charges are being shaped along the longitudinal axis of the rocket as well as across its circumference. It was also said that these shaped charges, even though they involve some apparently fragile charge structure, do not present any serious mechanical problems. They are able to withstand the vibration encountered without damage.

These developments hold promise of eliminating the familiar booster-type rocket so often used to provide short-duration, high-thrust, assisted take-offs. By designing the rocket charge with a fast-burning core encased in a slower burning main charge, the single rocket can provide high thrust level output for initial acceleration followed by extended power at a lower level. This would be particularly valuable in certain tactical applications where the dropping of booster rockets is undesirable. • • •

APPLICATIONS of rocket engines differ in final velocity.



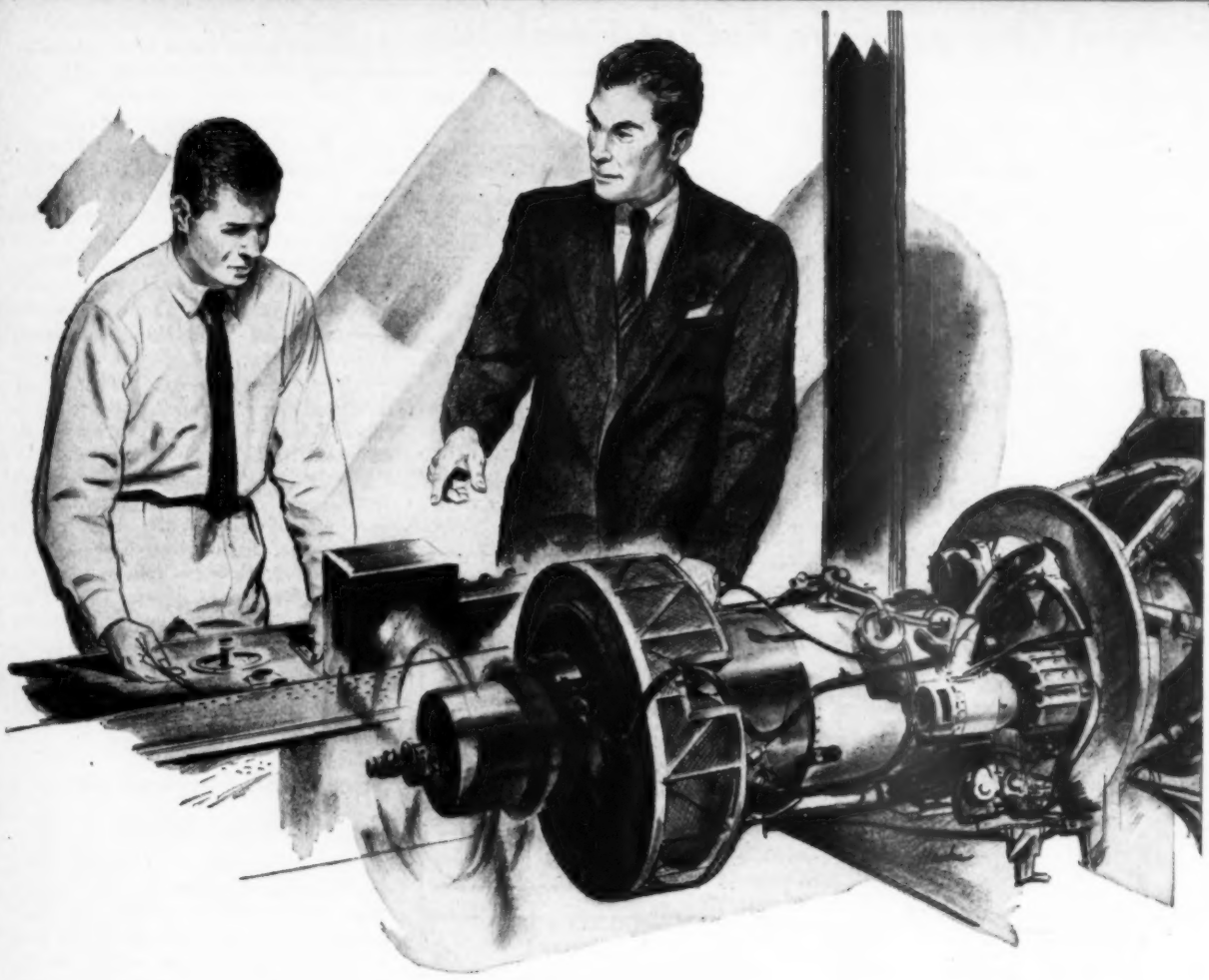
Parasite Fighter Squadron Formed at Great Falls, Mont.

First squadron of "parasite" fighters, launched and recovered in flight from Convair RB-36 bombers, has been activated. The Republic RF-84F's used in the technique will be assigned to the 91st Strategic Reconnaissance Squadron, Great Falls AFB, Mont. The bombers which will carry them to within striking range of their objectives will be those of the 99th Strategic Reconnaissance Wing, based at Fairchild AFB, Spokane, Wash.

NWA Buys DC-6Bs; Looks to DC-7s and Lockheed 1049Gs

Northwest Airlines has purchased a tenth Douglas DC-6B transport and is negotiating with both Douglas and Lockheed on a large quantity of additional aircraft. The latest DC-6B was one originally ordered by the British carrier Airwork, Ltd., and is due for delivery next winter.

NWA is reportedly paying a $300,000 premium for this and two other DC-6B's ordered by CGT-Air Algerie. The airline is also negotiating with Douglas for ten DC-6B's or DC-7's for delivery in early 1957 and with Lockheed for two more 1049G's to bring its Super Constellation fleet to six.



the man from Esso...

the technical service representative

In dozens of aircraft engine factories in many lands, teams of experts pool their combined skills to produce the most advanced equipment for the air-fleets of the free world.

Working hand in hand with aircraft and engine manufacturers is ESSO's Technical Service Representative. One of his jobs is to furnish advice on the correct application and use of aviation petroleum products for the latest power plants and airframes. His know-how contributes to the long operational life of thousands of passenger and freight transports in daily service along the airways of the world.

ESSO technical service, like ESSO research, has played an important part in the development of superior aviation petroleum products since the beginning of powered flight.

Another good reason why: **of all the World's international Airlines 8 out of 10 use**

ESSO

AVIATION PRODUCTS

TRANSPORT TRENDS

Washington, D. C., March 28, 1955

DESPITE GROWING INDICATION that a first order for U. S. built jet and turboprop transports may still come this year, airline buying of piston engine equipment continues at a high rate. Douglas Aircraft Co. alone reports January/February orders for 109 DC-6/DC-7 aircraft by eleven domestic and six foreign carriers. Other airlines are reported equipment shopping.

With this early start, orders for jets and turboprops before the year-end could make 1955 the biggest dollar year for transport buying in the post-war era.

A jet commitment this year, if it materializes, will most likely come from a U. S. international carrier. Interest among domestic trunks does not appear strong enough to overcome the pricing barrier.

KEY TO THE TURBOPROP SITUATION is an American Airlines' decision on a short/medium range transport. Feeling is that other carriers, particularly the smaller group of trunks, will have to follow AA's lead and buy soon after.

Two reasons are given. Turboprop costs are too high for these carriers to set their own specifications and shop for small numbers of aircraft. Second consideration is that orders will have to follow close after American's to take advantage of any price cut to be gained from its large order.

SUBSTANTIAL CHANGES in the transatlantic fare structure are on the horizon for next winter's operation, if recent recommendations of North Atlantic carriers are adopted. Major innovation would be a family fare plan during the November 1 to March 1 period that would provide a standard one-way deduction for the second adult passenger of $150 for first class and $130 for tourist.

Basic approach is to narrow the differential between first class and tourist fares. Off-season New York-London round trip tourist fare would go up from $425 to $475 and other fares would be increased proportionately.

WITH CONGRESSIONAL ACTIVITY in DME-TACAN row still running high (See page 38), strong State Department position on international implications of a U. S. switch in policy has brought the Air Coordinating Committee into action. After several top level meetings, ACC has delegated the issue to its NAV Panel to come up with policy recommendations by April 15.

Contention of State Department is that any ill-advised policy change could undermine foreign confidence in the stability of U. S. technical opinion and hamper future U. S. negotiation of international agreements even beyond the scope of aviation.

Broader interests in ACC than in the Air Navigation Development Board which supported TACAN could bring about a stalemate on U. S. policy. Instead of the straight Commerce-Defense line-up in ANDB, State and the Federal Communications Commission must be contended with in ACC. Dissension here could very well take the dispute back through top ACC to the White House before it is settled.

AMONG THE YOUNGER GROUP of airline executives, keep your eye on Robert E. Johnson, v.p. and assistant to the president of United Air Lines. A capable administrator who's handled sales, advertising and public relations up to now, he's slated for bigger things.

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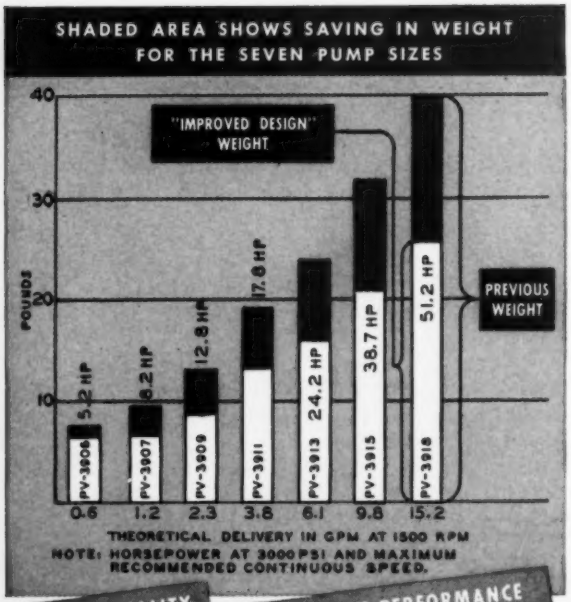

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

Transport Aviation

Public and Airline Apathy Could End 3c Mail Airlift

By WILLIAM V. HENZEY

THE 3¢ AIRLIFT, under which surface mail has been moving by air in experimental areas, could well be wiped out in six months unless enthusiasm of the airlines can parallel in intensity the opposition of the nation's railroads.

This is the considered opinion of top Government officials who base their views primarily on:

- **The recent court ruling** against "prolonged" experiments by the Post Office;
- **A one-sided propaganda campaign** under which Congressmen are seemingly left with little alternative but to defeat any legislation designed to give the Post Office permanent authority to ship 3¢ mail on the airlines.

Despite attempts to minimize railroad pressure against the airlift, there is ample proof in just about every Congressman's office, the Post Office, and even the White House, that the railroad opposition is steadily increasing.

If the current experiment is wiped out this year, estimates range from five to ten years before it could even get a foothold again.

• **Presently, there are four experiments** going on: (1) in the general New York/Washington-Chicago area; (2) along the east coast; (3) on local service airline systems; and (4) along the west coast.

• **The west coast experiment,** the last to get started, was contested in the U. S. District Court, District of Columbia by five major railroads. They were denied an injunction because the Judge ruled the Postmaster General possessed the authority to experiment with shipping other than airmail on the airlines.

But the denial was tempered by a qualification that the experiments should not be "unduly prolonged." There is doubt as to what constitutes an "unduly prolonged" experiment, but, unless something happens in between, the Post Office feels none too secure of the continuation of the New York/Washington-Chicago experiment, for example, which will be two years old this September.

There are indications the PO, through the Justice Department, may appeal the ruling to a higher court, but at presstime no decision was available.

• **PMG Arthur E. Summerfield,** at hearings before a House subcommittee last month, indicated the PO may seek legislation if necessary to assure continuance of the experiments which, of course, are the forerunner to an all-up mail program.

But with the lop-sided trend of Congressional mail in favor of the railroads' position, not even Summerfield appears optimistic of success on that score.

That is, not unless the cities which now have the 3¢ airlift urge that it be retained and those without it put up a clamor to get it.

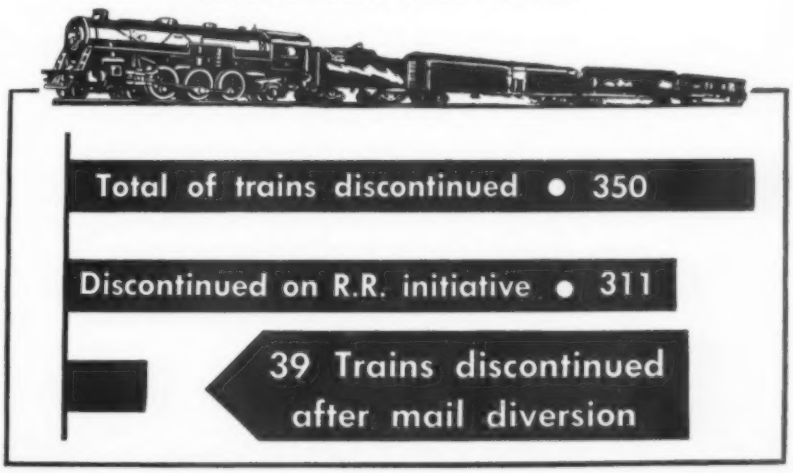
The airlines involved in the specific experiments now underway are and have been enthusiastic about the success of those experiments. But as for further expansion of the airlift, enthusiasm wanes somewhat because of the impact the low rates involved in the experiments might have on the overall service mail rate structure of the industry.

Generally, domestic trunks are paid about 45¢ per ton-mile for airmail (exact rate is in litigation) as compared to 18-20¢ in the airlift.

But there are those in the Government who term the airlines' fears naive. Although the Post Office continually pushes for lower rates, it is also keenly aware that it would have to pay the airlines a "liveable" rate for an all-up mail program, one of various reasons being that the success of the move depends so heavily on airline service.

• **This philosophy was amplified** by E. George Seidle, Asst. PMG, Trans-

Trains Discontinued Feb. 1, 1953 to Dec. 31, 1954.



portation, who told a House subcommittee recently that "The Post Office is partial to no one transportation meduim. We are guided in our purchases by the same motives as those of any other prudent shipper, namely, to realize economy, efficiency, and service.

"Coupled with this, however, we keep in mind that to give the desired service the transportation agencies must have rates which are compensatory, a kind of live-and-let-live philosophy."

For the Post Office, continuation and expansion of the airlift is a "must" if the Department is to discharge its obligation to the public of "improving service constantly."

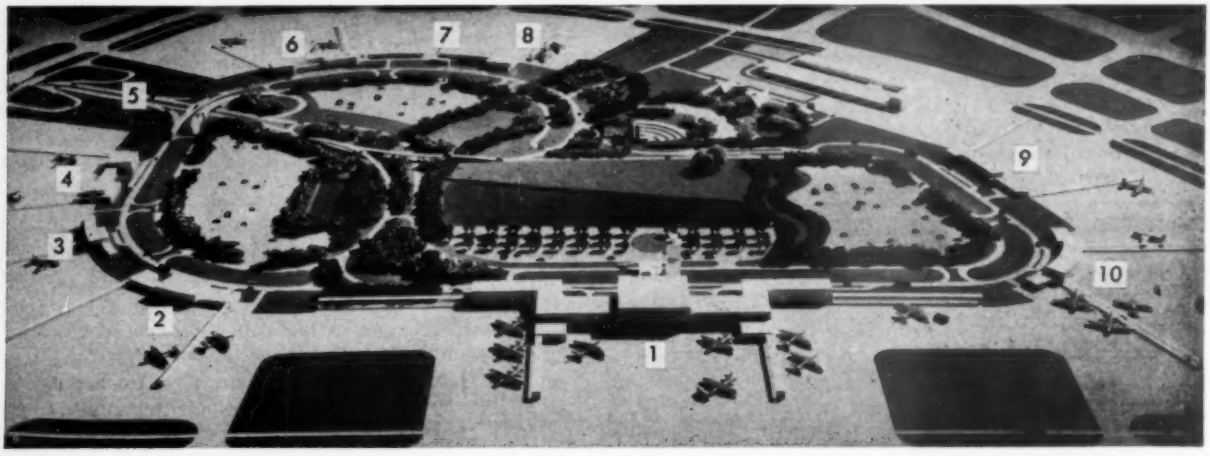
The PO also openly indicates it has been pushed into the airlift by the decline in available train service. In a recent two-year period, 350 trains were discontinued, 89% on the railroads' own initiative.

According to Seidle, another of the transportation evolutions, common in this country since the pioneer days of packhorses, etc., is now happening and the swing of mail traffic from the rails to airlines and trucks is consistent with, though perhaps following, the swing of passenger and express traffic to faster modes of travel.

But unlike forms of transportation that preceded and were superseded by the railroads, none had the wealth, political power, and general strength of the railroads. Thus, as is apparent today, the rails will not give up traffic without a struggle previously unmatched in transportation annals.

That the struggle has reached a high pitch today is significant when it is considered that the airlines will receive less than $2 million for 3¢ mail carried in fiscal 1955 in the current experimental areas while total mail payments to the railroads will be $330 million.

Theory, of course, is that the court decision, coupled with a favorable Congress can sidetrack the development perhaps for the next decade. Survival of the airlift, which could open a whole new era for the airlines, depends largely therefore on the support given by the public and the enthusiasm of the airlines. • • •



NATIONAL AIR LINES claims it has been placed in "an unfair competitive" situation between Eastern and American at New York's proposed Terminal City. Area allocation is as follows: 1. International Building, 2. Pan American, 3. American, 4. Eastern, 5. Van Wyck Blvd. access road, 6. United, 7. Northwest, 8. National, 9. present terminal building, 10. TWA.

NAL Charges N.Y. Port Authority with "Discrimination"

Carrier Objects to Allocation of Space at New York International Airport

By LOIS C. PHILMUS

NATIONAL AIRLINES went to court last week to oppose "discrimination" against it in the allocation of space in the proposed $60 million terminal project at New York International Airport. The airline asked the New York Supreme Court for a temporary injunction against The Port of New York Authority.

Authority officials, when asked by AMERICAN AVIATION to comment on National's objections, said:

"The Port Authority has violated no rights of National Airlines at International Airport; neither has it assigned an unfavorable location to National or any other airline in the new air terminal city development."

• **Meanwhile, Alexander G. Hardy,** NAL vice president and general counsel, told AMERICAN AVIATION that terms of the two-year-old lease-contract the carrier has with the Authority and which runs through 1974 give National the right to study proposals made by the Authority for 30 days in advance of their adoption. Then, if the airline rejects the proposal, as in this instance, the contract calls for the question to be submitted to arbitration.

Hardy says National had only three days in February to look over the plans suggested by the Authority and that subsequent verbal and written protests were ignored and arbitration refused.

National, therefore, has asked for a court review of its rights under the contract and which the Authority claims is no longer valid. "Serious and irreparable damage" is claimed by National if it is not allocated comparable space in the new terminal.

The modern, attractive Hertz counter above, located at the Los Angeles, Cal., International Airport, is Hertz' latest addition to its long list of airport rent a car offices. This new office, like other new Hertz airport offices being installed all over the country, is helping to bring you new passenger revenue. And here's how it's being done!

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Basic arguments behind National's fight for better positioning are:

1. Better location granted its biggest competitor gives Eastern Air Lines an unfair advantage. EAL's third position away from the International Building (see illustration) is directly on the main access road, Van Wyck Boulevard, while National is "20¢ farther on the taxi meter," Hardy observed.

2. Neither American, United or Eastern, it is further contended, have need of the Customs and Immigration facilities at the International Building, but National, with its Havana-New York flights, must, under the present proposal, deposit its passengers at the International Building, and then taxi more than half way around the airport to its terminal unit. It would be at least a half a mile from the terminal unit to the International building, Hardy estimates.

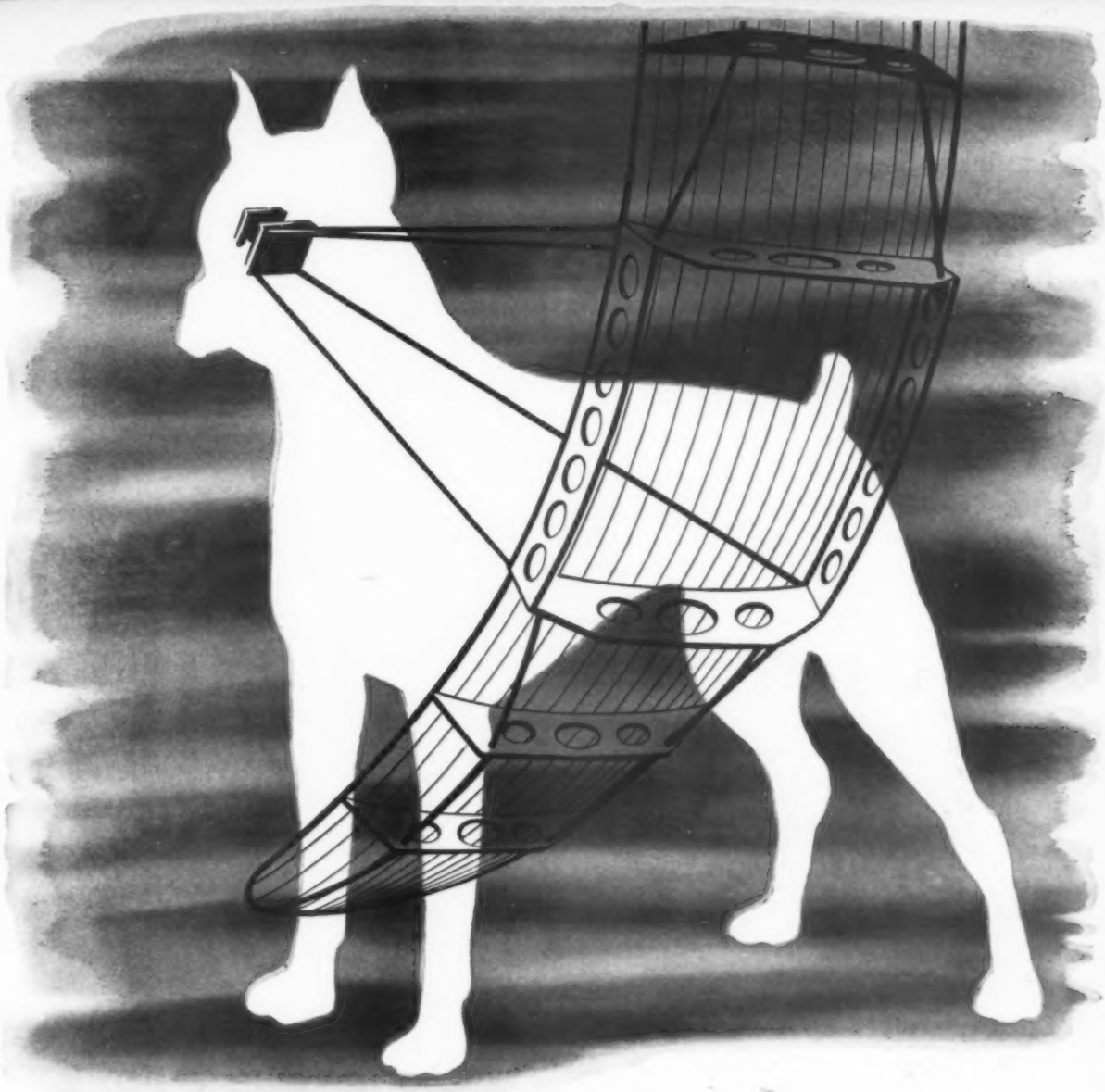
National based its request for an injunction and its charges of discrimination on: 1. Its record as a pioneer carrier at Idlewild. NAL was the first domestic carrier to move to the field and it was "three years and five months before any other domestic carrier came in," Hardy says. 2. It is said to rank second among domestic carriers and third among both domestic and international in generating traffic at the airport.

• **National's brief states** that the Authority had guaranteed in writing that "in any initial allocation of space in a permanent terminal building . . . your requirements will be given equal consideration with those of other air carriers." The brief contends that "such equal consideration has not been accorded the plaintiff."

National was engaged in a similar litigation in Dade County recently, when it filed an injunction suit against validation of a $21 million bond issue to be used for new terminal facilities at Miami International. National withdrew the suit last month when a compromise was reached with the Dade County Port Authority giving National more acceptable space commitments. The compromise came after modifications were made in plans for the terminal. • • •

Braniff Orders DC-7C's

Braniff Airways has ordered seven Douglas DC-7C's at a cost of $20 million. The contract, largest in the carrier's history for flight equipment, includes spaces and shop equipment for maintenance. Deliveries are due in late 1956 and early '57. The DC-7C's will be used first in South America.



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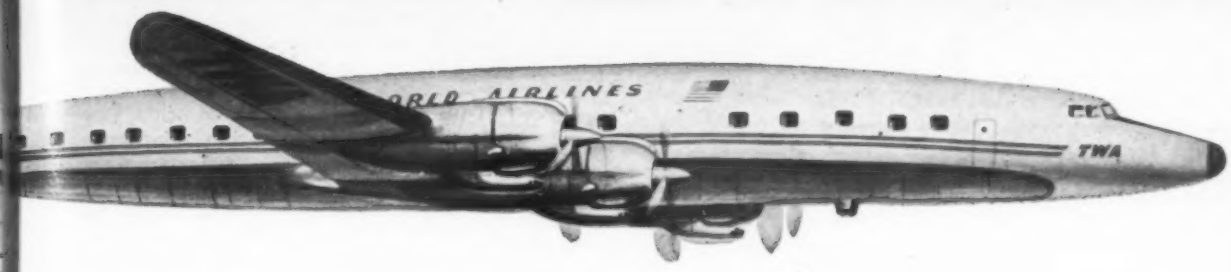

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IATA Carriers Discuss Traffic, Rate Problems

A SERIES of important matters affecting fares and cargo rates of IATA carriers flying across the Atlantic (North, Central and South) was discussed this month. Lack of agreement between the member carriers on some of the issues could jeopardize the future of IATA as a fare-and rate-setting body.

A series of meetings in New York was held to discuss a variety of topics affecting transatlantic passenger fares, while in Havana, Cuba, an IATA meeting was to make a "last-ditch" effort to prevent an open cargo rate situation coming about after March 31 (date when the present agreements on these rates come to an end).

The New York meetings were concerned primarily with: (1) ways and means of evening out the present peaks and valleys of traffic across the North Atlantic; and (2) solving the problems of fares between Europe and the area between the U. S. and northern South America (the fares are the same, or almost the same, direct or via New York).

It is understood that several solutions to the problem of the seasonal traffic variations on the North Atlantic were to be discussed. These include two off-season proposals—the re-establishment of an excursion fare and the extension of the family fare plan to the North Atlantic routes. Other North Atlantic problems up for discussion include the fares to be charged for Canadian Pacific's "polar" route to Europe to be opened this spring; the importance of non-IATA member Loftleidir's rate-cutting as a threat to IATA carriers; the number of passenger attendants allowed on tourist flights; and the division of first class and tourist class accommodations.

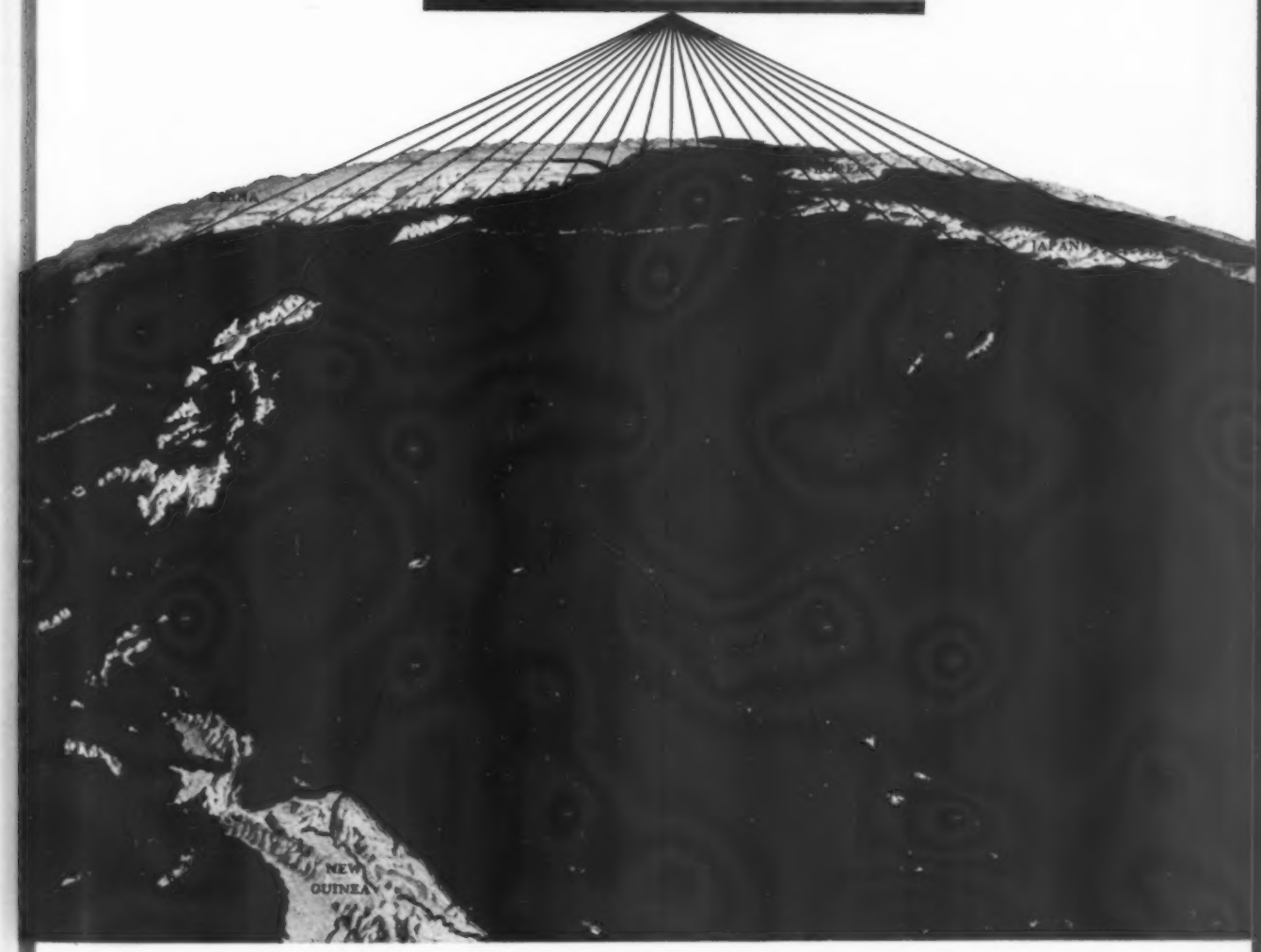
The South Atlantic situation is perhaps the most critical of any which has faced IATA, with Brazil reportedly having denounced all international fares and prepared to order its three international carriers to quit IATA if a reduced fare is not allowed for Panair do Brasil's L-49 Constellations. The Brazilian government contends that these aircraft are obsolete and should therefore benefit from the 20% fare reduction authorized by IATA for DC-4 flights between Europe and South America (Iberia is the only IATA carrier operating this equipment on the route). Argentina is stated to want the DC-6 to be considered in the same category as the L-49 and therefore also to benefit from the 20% cut.

The situation on fares between Europe and the area between the U. S. and northern South America is that PAA reportedly is opposed to a lower fare for the direct flight than that via New York, while air France and KLM are urging such a differential. As for the transatlantic cargo rate, it seems that there is little hope of an open rate situation being avoided, although there may be an extension of the present rates for a few more weeks. PAA and one or two small carriers are holding out for bulk discount, while most of the other IATA airlines prefer special commodity rates.

CAA Creates New Paris Post

CAA has announced appointment of R. B. Maloy, former Chief-Flight Test Branch in Washington, to a newly created Paris post of International Region Aircraft Engineering Advisor. His duties will be to counsel U.S. government agencies, manufacturers and air carriers in foreign countries and to advise foreign governments and manufacturers on U.S. requirements.

bases unlimited



The recent unveiling of the United States Navy's new 4-jet waterbased aircraft, the Martin XP6M SeaMaster, has focused attention upon one of the most important discussions in America today: The Waterbased Aircraft concept.

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. . . The SeaMaster is Ship No. 1 of a new aircraft *type*. In speed it is in the over 600 m.p.h. class, and it spearheads a whole new arm of the naval arsenal — the Seaplane Striking Force.

. . . The SeaMaster is not a research airplane, but the prototype of an operational weapons system designed to remain on duty for extended periods anywhere in the world. For the Navy program includes facilities for off-shore maintenance, refueling and resupply which give it a mobility never before possible in military aircraft.

To American security the SeaMaster now offers *bases unlimited!*

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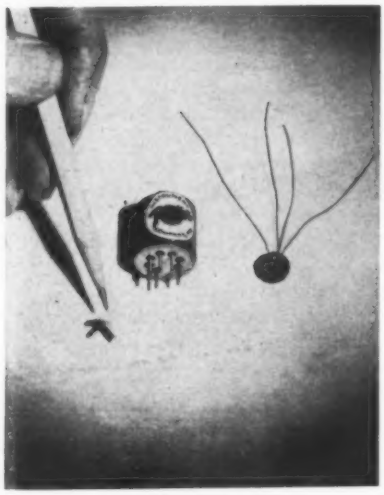
Rival of Transistors: Magnistors

A NEW CIRCUIT ELEMENT, the Magnistor, promises new possibilities in the design of miniaturized airborne computers and data handling equipment.

The new control device is based on an invention of R. L. Snyder, computer engineer and former chief of the engineering group of the largest computer installation in the world at Aberdeen Proving Ground, where he had charge of ENIAC, EDVAC, and ORDVAC. It is manufactured by Potter Instrument Co., Inc.

The device can be used to replace electron tubes in many applications and affords the reliability of magnetic circuits. Already used in classified military applications, Magnistors may prove valuable in automatic navigation computer systems of small size. Their rugged construction would be an inherent advantage in guided missile or aircraft applications.



Magnistor

Magnistors are small, saturable reactors of ferro-ceramic material. They have either *transient* or *permanent* characteristics. The transient class, for amplifier use, has signal coil winding carrying a sine wave signal from 100 kc to 10 mc in frequency, or pulses with a repetition rate of 0 to 10 mc.

The *permanent* class is a bi-stable storage device with a non-destructive readout capable of handling watts in the readout circuit. A "memory" device, it has a signal coil together with a "set" and "reset" coil. Two signal impedances, current controlled, are possible; low and high impedance.

The Magnistor's characteristics are similar to those of vacuum tubes. Presentations are comparable to customary plate characteristics curves.

British Transports in Production

De Havilland's Chester plant is used for the manufacture of Comets, Herons, Doves, Vampire Trainers, and Venom all-weather fighters.

Vickers-Armstrongs' Hurn plant is the main Viscount production center; some fifty of the 178 ordered have been delivered to date.

Bristol's assembly hall at Filton is full of Britannias in various stages.

Hunting-Percival's Luton plant is the production center for the Pembroke military transport which has been ordered by the Air Forces of Belgium, Southern Rodesia, and Sweden.

PROCUREMENT NOTES

INDUSTRY COMMENT on the proposed regulations for Copyright and Technical Data (Part 2, Section IX, ASPR) has been received and final changes are being made in the Pentagon. Among others, the American Patent Law Association suggests that the Government take no title to copyrights. They maintain licenses are sufficient and suggest non-exclusive royalties. However, Defense officials state they must have clear titles to certain moving pictures, training books and technical manuals.

* *

DEMOCRATIC EFFORTS to repeal the tax law provision for rapid write-offs of capital expenditures have convinced Pentagon officials that their rules for depreciation allowances should not be tied to the Internal Revenue Code which often reflects political changes. The present draft of the depreciation section of the new proposed cost allowance principles permits use of the declining balance for normal depreciation in special instances. Until the new rules are submitted to industry and then officially adopted, the Air Force is continuing the old method for normal depreciation. However, two methods are being considered to allow immediate acceptance of accelerated amortization. One, suggested by service auditors, would be by directive signed by Mr. Wilson. The other, which has procurement officials' aproval, calls for an interim cost interpretation for the present Part 6, Section XV, ASPR.

* *

REFUNDS of "hundreds of millions" from contractors who have received overpayments are expected by Pentagon fiscal officials as a result of a "dynamic debt collection policy ordered by Secretary Chas. E. Wilson. Mr. Wilson is reported to have been surprised by the number of contractors who "have been operating entirely on federal funds." He believes that efficiency and economies result when firms use and risk some of their own money.

* *

CONTRACTORS CAN RECEIVE a new edition of the Armed Services Procurement Regulations and two recent revisions by sending $3.05 to the Supt. of Documents, Government Printing Office. The new patent regulations (and a new revised list of items required for the Buy American Act) are included in the revisions.

(Continued on Page 80)

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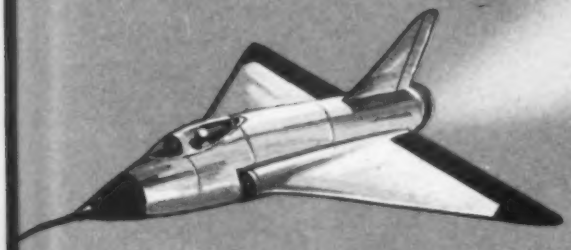

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Bendix fuel metering is used today on nearly all American airliners, and on a great majority of military aircraft. This includes injection type carburetors and direct fuel injection, as well as fuel metering and complete engine control systems for jets.

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Export Sales: Bendix International Division, 205 E. 42nd St., New York 17, N. Y.

(Continued from Page 78)

THE HEBERT SUBCOMMITTEE of the House Armed Services Committee has been holding executive hearings on the delays and contractual difficulties of building the new Spanish airports and naval bases. Most complaints stem from the Spaniards who protest that the Bureau of Yards and Docks is not spending money as fast and lavishly as did the Army Engineers in Morocco.

* *

SEVERAL PLANS for the reorganizing of MATS with its half-billion annual operating expenses are under consideration. Several of the supplementary services may be detached and the air transportation activities placed under a corporate-type of accounting known as industrial funding. The latter plan is being handled by Assistant Secretary Lyle S. Garlock, Comptroller of the Air Force, who had considerable experience in installing a similar business system for the Military Sea Transport Service.

SEVERAL EFFORTS have been made to "resolve" the problem of incentive benefits based on profit-sharing plans which the Air Force has disallowed. Agreement has been reached to accept such plans of firms whose military business is less than half the total. Little progress has been made on a policy for companies whose main effort is military production.

* *

THE AIR FORCE AND NAVY have given their views on the proposed standardization of aviation turbine engines to the special six-man committee appointed by Secretary Wilson to draw up a workable directive for a long range program providing for a minimum number of types and sizes. One industry spokesman has proposed that the turbojet directive be postponed until a plan be drawn for turboprops. A tentative suggestion provides for three sizes, 4000, 9000 and 15,000 hp. These sizes, it was stated, would meet all needs for military transport.

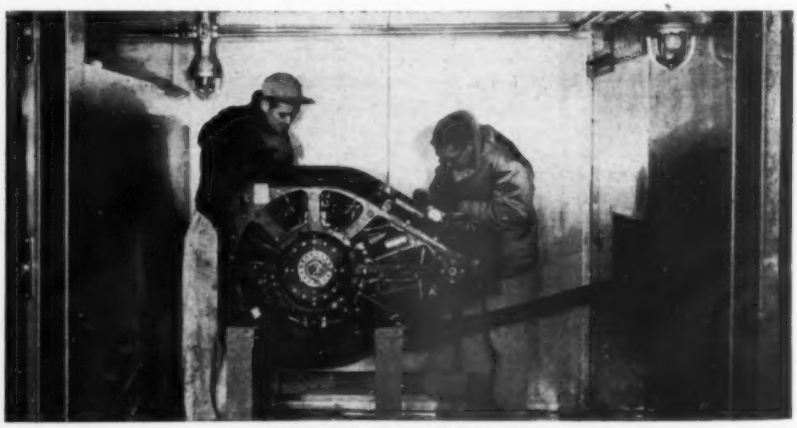
Commercial Use of In-Flight Refueling Predicted in Five Years

Flight refueling offers great potentials in augmenting air cargo transport payloads and is possibly not more than five years away in development, an official of Flight Refueling, Inc., told AMERICAN AVIATION recently. The occasion was the first general press inspection of the company's new "wet" and "dry" laboratories at its plant adjoining Friendship International Airport, Baltimore, Md.

This official predicted that by use of his company's equipment turboprop and jet cargo planes would be able to take off with a maximum of cargo and a minimum of fuel aboard and refuel aloft. He estimated that cargo carriers would be able to add 25 per cent and upwards to their takeoff payloads. On the Lockheed C-130, for instance, by using refueling a cargo operator could add 6000-plus pounds to the design payload of 25,000 pounds.

While there might be some psychological hazards to refueling passenger flights, this official predicted that refueling techniques might prove useful in assisting occasional non-stop transatlantic flights to stay non-stop when their pilots misjudge the winds and have to put in at an intermediate terminal.

Flight Refueling is developing improvements to its apparatus that will produce a higher rate of flow than the A-12 units it now builds for the U. S. Air Force's B-47s and the Navy's AJ-2 tanker. The higher rate of fuel flow information is classified though the A-12 delivers 250 gallons a minute.



Flight Refueling's "wet" laboratory.

Pattern for the Future: Fewer, Stronger Nonskeds?

Surveys Show Scheduled Carriers Lost $64 Million To Nonskeds at Burbank in Three Year Period

By FRED HUNTER

THOUGH THE NUMBER of large irregular passenger carriers is steadily declining, North American Airlines and Skycoach, two surviving systems dominating the transcontinental nonsked scene, are bigger and stronger than ever.

That is the major conclusion to be drawn from an air transportation survey made by seven chambers of commerce in the northern Los Angeles County area.

• **Figures in the report** show the large irregulars in the aggregate have lost much ground; in each of the last three years they have handled fewer passengers at Lockheed Air Terminal, their main base of operations on the west coast.

Elsewhere on this page are figures the seven chambers of commerce obtained from Lockheed Air Terminal's official records on revenue passengers handled at Burbank by the irregular carriers.

The report translates these traffic figures into a three-year loss in revenue to the scheduled airlines of more than $64,000,000. The scheduled carriers would not have missed out on such a substantial amount of revenue, the report goes on to say, were they not "denying convenient air service to the 2,185,000 people" residing in northern Los Angeles County by slighting Lockheed Air Terminal in favor of the Los Angeles International Airport.

• **The chambers seeking improved** service for the Burbank airport are these: Burbank, Glendale, Hollywood, North Hollywood, Pasadena, San Fernando and Van Nuys. For all of these communities, driving time to the Burbank airport is less than to the Los Angeles International Airport. They represent 45.3 per cent of the total population of the area and 48 per cent of the income, the report shows.

Most startling figure revealed by the report is that of the average passenger trip for the transcontinental irregulars—2,019 miles. This trip-length average, the chambers say, was obtained directly from the carriers themselves and therefore can be considered accurate. It is, in itself, almost a self-explanatory answer to the question of how certain nonskeds have been able to net such substantial profits at cut-rate fares. It may also be regarded as a confirmation of the claim of the certified carriers that the nonskeds are cream-skimmers.

The figures which might be said to be most heartening to the scheduled airlines are those showing the irregulars' declining traffic curve at Burbank. From 1952 to 1953, the passenger decline for the transcontinental nonscheduled carriers was about 10 per cent. But 1954's decline from 1953 was a 40 per cent falloff. Significantly, the scheduled carriers during the same period registered consistent traffic increases. Lockheed Air Terminal's figures show 536,816 passengers handled by certificated airlines at Burbank in 1954, as compared to 497,105 in 1953.

• **The same traffic decline** took place in the intrastate field, although not in the same proportions, and finally was reflected in the sale of the assets of California Central Airlines in bankruptcy in February, followed by the termination of its operations, leaving only one survivor, Pacific Southwest Airlines, in a market that at its peaks has had up to six carriers competing for the Los Angeles-San Francisco coach business.

Lockheed Air Terminal has been the west coast center of nonsked activities since 1947 when the scheduled carriers moved over to the Los Angeles International Airport, and what goes on at the Burbank airport is closely representative of the entire domestic nonscheduled business. Empty ticket counter spaces once occupied by the various large irregular carriers testify to the new order.

• **In 1953, Lockheed was leasing** counter space and other facilities to nine carriers engaged in irregular interstate operations, including Aero Coach, Air America, Caribbean-American, Panamint, U. S. Air Coach, World Wide, North Star, Skycoach and North American. Half a dozen others, like Peninsular, Economy and New England, which had bases elsewhere, operated into the airport with varied regularity.

IRREGULAR CARRIER PASSENGER TRAFFIC AT BURBANK

	Intrastate Carriers	Transcontinental Irregular Carriers	Total Irregular Carriers
1952	192,795	250,792	443,587
1953	145,547	238,673	384,220
1954 (Nov.-Dec. Estimated)	141,380	176,600	317,980
Total Three Years	479,722	666,065	1,145,787
Average Trip—Miles	284	2,019	?
Revenue Passenger Miles	136,720,770	1,344,785,235	1,481,506,005

STRUCTURAL TESTS on Martin's multi-jet seaplane, the XP6M-1 "Seamaster," move forward in the firm's Baltimore hangar. Wings have been subjected to loads of approximately 350,000 pounds. The aircraft is due to be flight-tested this spring.

All but two have disappeared from the Burbank scene. Some are still operating, but, if so, they are flying mostly CAM trips and no longer engage in the transcontinental lists.

Numerous reasons are given for this rather abrupt decline in the number of active irregular carriers at Burbank, but the one most often advanced is that the others haven't been able to keep up with North American. Skycoach (Great Lakes/Currey Air Transport) is the only one that hasn't thrown in the towel. When North American acquired its new 102-passenger DC-6B equipment recently, Skycoach promptly cut the Los Angeles-New York one-way fare from $99 to $88, plus tax, to advertise the lowest fares between the coasts.

• **Skycoach also has started** going after the business with a new name, Transcontinental Air Lines, which it has painted on its DC-4 equipment and is using extensively in its radio advertising. A sign with the new name has gone up alongside the Skycoach and Great Lakes Airlines signs over the carrier's Burbank ticket counter. The Skycoach lease at Lockheed, incidentally, comes under still another name, Currey Air Transport.

No figures on individual company traffic are available at Lockheed Air Terminal, but it is generally understood that in the face of an industry loss of 40 per cent in Burbank traffic, North American actually showed a gain for 1954 over 1953. Its operations have been netting a profit of more than $1,000,000 a year for the last several years.

• **North American Airlines** has become Lockheed Air Terminal's biggest airline customer, its total payments for space rentals, landing fees and other service charges now exceeding those of United Air Lines, long the Burbank terminal's top tenant among the scheduled carriers. Its facilities at Burbank include a $200,000 maintenance and overhaul hangar which incorporates an engine overhaul shop and the equipment for the overhaul and repair of all accessories except instrument. This maintenance base comes under the direction of Al Goldberg, formerly director of maintenance for The Flying Tiger Line and now vice-president of maintenance and engineering for Twentieth Century Aircraft, Inc., one of the companies in the North American group. This also is the company which purchased the two new DC-6Bs from the Douglas Aircraft Co. for approximately $2,250,000 for operation by the North American Airlines carriers. James Fishgrund is the president of Twentieth Century Aircraft.

In 1954, North American averaged 10.8 hours utilization per day for its DC-4 equipment. No deduction is made

for overhaul time in computing utilization, and North American had one 15,000 man-hour major during the year. It uses one lump overhaul rather than requesting CAA for authorization to advance the period from the presently approved 11,000 hours to 12,000 hours.

North American employs the equalized check system for inspection under a program which does not require an aircraft to be docked for more than eight hours at one time. It has approval for 1400 hours on the R2000-7ME engine which power its DC-4s and it is now requesting 1500.

North American's excellent 1954 engine failure rate of 13,009.7 hours per failure is undoubtedly attributable in part to the relatively long stage lengths it flies, but operating and maintenance practices also have to be credited.

• **Plug change is at 230 hours** and at this time North American also inspects the nose case, which the record shows is frequently responsible for engine failures. After 900 hours, inspection of the nose case is stepped up to every 100 hours and an engine is pulled at the slightest provocation.

As in the case of its six DC-4s, North American will do its own maintenance on the new DC-6Bs and has designed a dock that is adjustable to fit both types of aircraft. Its engine shop also is now being set up to handle overhaul on the P&W R2800-CB17 engines.

The marked change that has taken place in the domestic nonsked picture is illustrated in other ways. None, perhaps, is more revealing than the fact that North American's ticket agents at Lockheed Air Terminal have a refund account and can, and do, make refunds on the spot. The Los Angeles Chamber of Commerce hasn't received a complaint concerning a nonscheduled carrier in over a year, according to Clyde Barnett, manager of its aviation department. It used to be almost constantly besieged by aggrieved passengers. The common complaint: inability to collect on refunds.

• **From another angle** is the report of Glen D. Woodmansee, CAA 4th Region attorney, on the decrease in air safety violations committed by irregular carriers. From July 1 through December 31, 1953, enforcement actions included one operating certificate revoked, one operating certificate suspended, one captain's pilot certificate revoked. one copilot's certificate suspended, civil penalties totaling $1,475 invoked, and two reprimands issued. For the corresponding six months of 1954 there were merely two reprimands.

North American's CAB troubles and its campaign for a certificate of public convenience and necessity are widely known in the industry, and both may be nearing a climax following Examiner William B. Cusick's recent recommendation that the large irregular carrier letters of registration of the individual operating companies be rerevoked. This recommendation was aimed at Twentieth Century, Trans National, Trans American and Hemisphere, four of the five operating companies under whose certificates North American currently is flying.

• **The examiner's recommendation,** which coincidentally came just a few days after North American took delivery of its second new DC-6B from the Douglas Company, will not deter North American's principals from pursuing their drive for a CAB certificate. Said Secretary Stanley W. Weiss:

"I feel we have a better chance for ultimate certification in the immediate future than at any time in the past."

The reason: "Certain people in Congress and in some government circles now realize the noskeds were correct in pioneering air coach in 1946."

President Jack B. Lewin declared "no stone will be left unturned" to reverse the examiner's recommendation.

• **The big nonsked also** is involved in litigation over the use of the name North American Airlines, which North American Aviation calls infringement. North American Aviation won the first round in federal court in Los Angeles, where Judge M. Hall found the evidence was "overwhelmingly in favor" of the aircraft manufacturer. North American Airlines has appealed in the 9th U. S. circuit court.

North American currently operates over two transcontinental routes between Los Angeles and New York. One is via Chicago and the other is via Dallas. Its aircraft fleet includes the two new Douglas DC-6Bs, six DC-4s and one DC-3, the latter being used to shuttle San Francisco Bay area or San Diego passengers into Lockheed Air Terminal to connect with the transcontinental flights. • • •

Colonial Employes Form Fund To Vote on EAL Merger

When Colonial Airlines' stockholders meet in mid-April to vote on the airline's agreement to sell its assets to Eastern Air Lines, a majority, if not all, of CAI's 700-plus employes will be represented through a single voice, that of the Colonial Employees Mutual Fund, Inc.

The Fund, which has made no decision yet whether to vote its holdings in Colonial for or against the merger, was incorporated in New York last October. It initially purchased ten shares of CAI stock to get representation; recently decided to increase this to 110 shares, but its holdings still represent a token share of the company's 515,600 shares outstanding.

The Fund does not consider itself a dissension group or an opposition minority stockholders group. Rather, it was formed as a seemingly-natural outgrowth of the airline's years of uncertainty during which merger deals with various airlines have been on and off repeatedly.

Silver

Taylor

The group was organized "in order that employes as minority stockholders might have some voice in the formulation of plans and policies which so vitally affect us. In their capacity of stockholders, the employes would have a direct voice in the affairs of the corporation and would be in a position to place their ideas and suggestions with respect to the operation of the company before management and other stockholders."

Membership in the Fund is, of course, limited to Colonial employes. Each employe is entitled to subscribe to one share of Fund stock ($10). The Fund is managed by directors elected by the employe-stockholders.

At a meeting in New York last month, CAI employe Robert Silver was named president of the group, Vernon A. Taylor, vice president, Dave Forrester, treasurer, and Stanley Heller, secretary. Silver, Taylor, and Forrester also were named directors, as were employes Edward Bristol, Sam Barnett, and J. Strong.

Legal adviser to the Fund is a former CAB chairman, James M. Landis. • • •

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Recent CAB Decisions

National Airlines granted temporary authority to serve Newport News-Hampton-Warwick, Va., as an intermediate between Richmond and Norfolk, subject to restrictions.

Allegheny Airlines directed to show cause why final mail pay for year ending March 31, 1955, should not be fixed at $1,839,563.

New York-Louisville Nonstop Case, involving American, Eastern, and TWA, has been expanded to include additional service applications of those carriers beyond the nonstop issue.

Pending Cases

CAB has heard oral argument and taken under advisement **Trans-Pacific Airlines'** application for renewal of its certificate in Hawaii. Since overseas routes are involved, CAB's decision is subject to Presidential approval.

The question of whether **Allegheny Airlines** and **Southwest Airways** will have to face CAB hearings in connection with their recent purchase of bankrupt California Central Airlines' aircraft is now also under study by the Board.

CAB was again scheduled to take up the **States-Alaska Case** in executive session the week of March 14, but as yet there are no signs of when the case will move to the White House for final action.

CAB Applications

West Coast Airlines applied for certificate to conduct helicopter operations in Seattle and Portland areas, carrying persons, property, and mail.

North Central Airlines asked for authority to conduct helicopter operations between 22 eastern Michigan cities and airports in the Detroit area.

Guest Aerovias Mexico, S. A. applied for a foreign air carrier permit to operate nonstop between Mexico City and Chicago on proposed new route between Mexico City and Windsor, Ontario, Canada.

Western Air Lines requested elimination from its trunklines certificate of six points which it recommended for service by Frontier Airlines. Points are Jackson, Lewistown, Scottsbluff, Alliance, Hot Springs, and Spearfish.

Examiner's Report

Transportes Aereos Nacionales, S. A. foreign permit amendment recommended by Examiner Joseph L. Fitzmaurice to include Belize, Dr. Honduras as an intermediate on Miami-Honduras route.

CAB Calendar

Mar. 28—Hearing, Domestic Trunklines Service Mail Rate Investigation. Washington, D. C. Postponed from Mar. 14. Docket 6599 et al.

Mar. 29—Oral argument, Domestic Freight Forwarder Investigation. Washington, D. C. Docket 5947 et al.

Mar. 29—Hearing, Reopened Route 58 Labor Case. Tentative. Docket 2839.

Mar. 30—Hearing, VARIG Foreign Permit Case (Brazil-Washington New York Service). Washington, D. C. Docket 6891.

International Aviation

By Anthony Vandyk

IF THE AUSTRALIAN government has its way Qantas Empire Airways will become the first airline to provide through round-the-world service. The plan is for QEA'S transpacific route to be extended east from San Francisco to connect in London with QEA's westabout Sydney-London route. Australian government negotiators are in Washington at this writing to discuss the matter with the State Department.

• •

QEA ISN'T THE FIRST airline to be actively interested in a round-the-world service through San Francisco. Several years ago BOAC announced that it planned to extend its London-New York route to San Francisco and thence across the Pacific to connect in Sydney with its eastabout London-Sydney route. It also revealed plans for a more northerly round-the-world service by the extension of the present London-Tokyo route eastward to Canada and London (this would probably not be an extension of the present London-Montreal route westward but rather an entirely new "polar" route with Winnipeg, Edmonton or Vancouver as the Canadian intermediate).

• •

SCANDINAVIAN AIRLINES System is the only carrier which has actually made a proving over its projected round-the-world route. The SAS route involves the extension of the airline's present eastabout Stockholm-Tokyo service to Alaska, Greenland and back to Scandinavia. The service was to have been inaugurated this spring but now will be delayed until DC-7C equipment is available, probably late next year.

• •

IT WOULDN'T BE RIGHT to discuss round-the-world services without mentioning Pan American World Airways which for many years has had a through service from New York to the West Coast via Europe and Asia. The gap between Los Angeles and New York, however, can only be bridged by a circuitous and slow routing involving connections between the weekly LA-Guatemala City, the thrice-weekly Guatemala City-Miami and the daily Miami-San Juan and the San Juan-New York flights; or else by continuing beyond Guatemala City to Panama City and Caracas, connecting in the Venezuelan capital with one of the PAA Caracas-New York flights.

British VTOL Transport Is Years Away

THE ROLLS-ROYCE "Flying Bedstead is the result of 10 years' work and it will take another 15 years for the vertical take-off vehicle to evolve into a commercial air transport, officials of the British engine company have stated. They forecast that VTOL airliner will be quite unlike anything today, with small, narrow delta wings. The implication is that jet-lift as an ancillary will be applicable economically only to supersonic transports.

Rolls-Royce hints that future VTOL engines will be "distant cousins" of the Soar turbojet; that is to say, simple, low-pressure ratio units with elementary fuel systems (since there will be no need to cater for altitude control); thrust/weight ration will be at least seven to one. The VTOL engines will not be used for propulsion; experiments with jet-deflection and tiltable engines have convinced Rolls-Royce that such arrangements would (a) add complexity and weight and (b) lack required precision of control. Engine failure will be guarded against by a very great multiplication of units and extensive duplication of fuel systems and controls.

Saving of weight by (a) simpler landing gear and (b) much smaller wing of size for optimum cruising will compensate for weight of VTOL engines and fuel. All-round smaller and lighter airplane will require much less power for forward propulsion. Flight plan will be: rise vertically—cut in propulsion engines, cut out VTOL engines—cruise—cut out propulsion engines—stop—descend vertically on VTOL power.

Transport Briefs

SABENA Belgian World Airlines has ordered six DC-7C's for delivery in the fourth quarter of 1956; this brings the total sales of DC-7's to 139 . . . **Air France** has leased five Morane-Saulnier single-engine trainers from the French government . . . **Hong Kong Airways** has taken up its option for a second Viscount 700D with long-range "slipper" tanks, bringing total Viscount orders to 179 . . . **UAT-Aeromaritime** has taken delivery of its second Nord 2501 Noratlas freighter.

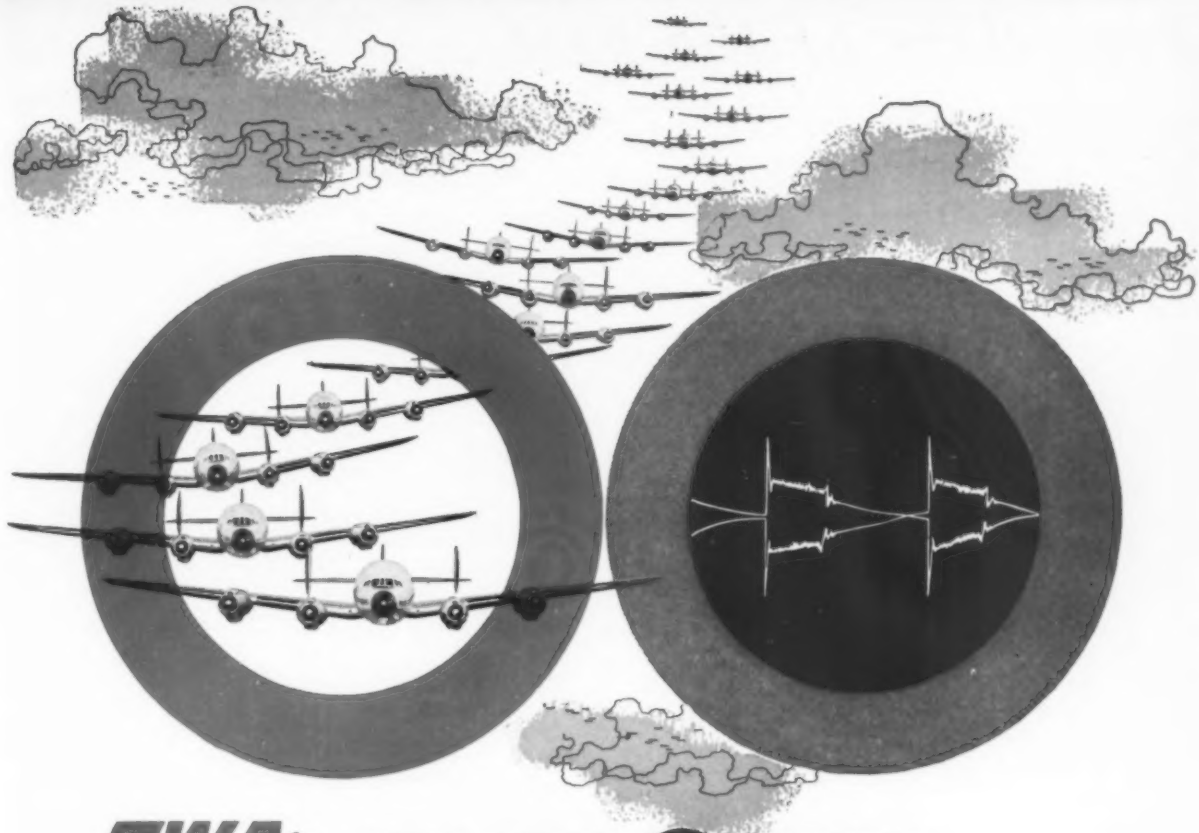
British European Airways will start operations to Corsica and Salzburg this summer and will also operate a first-class flight to Brussels. There will be cheap (30% discount) night flights to Stockholm, Oslo and Copenhagen . . . **Trans-Australia Airlines** has named John Ryland as general manager in place of Lester Brain who has joined de Havilland's Australian subsidiary as managing director . . . **Australian National Airways** has ordered two more DC-6B's bringing its pressurized fleet to four DC-6B's and two DC-6's.

Manufacturing Briefs

The first production **Fokker** S-14 jet trainer has made its initial flight; it is one of a batch of 20 ordered for the Dutch Air Force . . . The French government has increased its order for **Morane-Saulnier** MS 733 Alcyon piston-engine trainers from 100 to 125; seven Alycons have been ordered by the Cambodian government . . . **Turbomeca** is testing a 2500-lb. thrust turbojet, the Gabizo; the French company is also working on a 3500-lb. turbojet and a turboprop of about 1800 hp . . . **Hispano-Suiza**, another French engine firm, is test running a 2200-lb. thrust turbojet, the R-800.

France's **SIPA** company is now delivering the last of 50 S 121 two-seat trainers and is to convert 30 S 11's to S121 specification . . . First production version of the **Hurel-Dubois** HD 32 made its first flight on Feb. 11; three of the French high-aspect-ratio-wing transports are now flying—two HD 32's and one HD 31 . . . Supersonic speed in level flight was attained by France's **SFECMAS** Gerfault 1B on Feb. 11; the new version has a larger wing area than the 1A and has better take-off and landing performance.

FRANCE'S LATEST PERSONAL PLANE is the Nord NC 856N, a derivative of the NC 856A spotter aircraft; powerplant is a 160-hp SNECMA 4L08.



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*ENGINE ANALYZER IS MANUFACTURED UNDER JOHN E. LINDBERG PAT. NO. 2518427.

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EN ROUTE . . .

WAYNE W. PARRISH

Jottings from my Notebook

THIS PAGE was launched some years ago to give you a lot of oddities about foreign travel—the stuff the National Geographic omits—but I confess my roaming around strange lands has been curtailed of late due to reasons beyond my immediate control.

For one thing American Aviation Publications has been expanding so rapidly that I haven't been able to get away. Business is very good, thank you, and especially the advertising in this magazine which you read. We've got a lot of projects underway, including the first edition of *Who's Who in World Aviation*, just off the press, and the new International Edition of *Official Airline Guide* a few months away, and all sorts of things like that.

Trips that Never Came to Pass . . .

But I thought I was all lined up for some good yarns until fate intervened. I had a swell trip all lined up with British West Indian Airways covering a bunch of those beautiful islands in the Caribbean with a side trip on Art Williams' British Guiana Airways into the South American jungle.

Then along came TWA with a deluxe 8-day trip to Europe in its new Lockheed 1049G Super Constellation. We were to spend St. Patrick's Day in Dublin and then fly to two other points, Cairo and Madrid. So I cancelled the BWIA trip—I won't blame them if they shut their doors to me in the future—and told TWA okey. Just as I was dreaming of all sorts of plans in Dublin and Cairo, TWA postponed the trip because the new Connies weren't quite ready. So there you are.

Since April is very busy, the only thing I've got lined up is a 4-day trip to Caracas, Venezuela, with Delta-C&S on April 1 on its first DC-7 schedule to South America. I'll see what I can dig up for you. Meantime, I'm having to rely on my notebook for bits and pieces.

I keep getting reports that Paris is more expensive to the American tourist month after month. Friend of mine took his wife over there recently. She sent a dress out to be cleaned. The charge was $7.50. Sounds fantastic, but it's typical. Paris is really "taking" the American tourist these days with hotel and restaurant charges that are outrageous and inexcusably high. The French are overdoing it.

Out on the west coast early this year I got acquainted for the first time with the Palm Springs desert area and I must say that I was quite favorably impressed. I stayed a couple of days at Palm Desert, about twenty miles down the road from Palm Springs, at a very fine small hotel built along motel lines called Shadow Mountain Terrace. I've never had much to do with the desert resorts, but I'm getting to like them. The tranquility and colors are very restful.

Then a few days later up north I

got the full treatment of the San Francisco Bay area.

Thanks to Warren Burke, United's public relations manager for San Francisco, I got the first full all-out tour of one of the most fascinating cities in the world and certainly one of the fine showplaces of America. I've known Warren from 'way back when he headed up TWA's sales office out there and he was good enough to take me to Muir Woods (big redwoods) and all around the city on a cloudless day. Warren's a native with all the enthusiasm of a crusader so I got thoroughly sold on the area. We had lunch at Tarantino's on Fisherman's Wharf, best spot in that section of good restaurants.

This Counter Serves Only Soup

If you like really good split pea soup, don't fail to stop at Andersen's on U.S. Highway 101 at Buellton, 45 miles north of Santa Barbara, California. This place specializes in Danish-type pea soup and has a counter serving nothing but soup. I like it so much I bought a case of it at Macy's in New York recently.

Out at Hiller Helicopters in Palo Alto, California, recently, had a fine hop in a Hiller 23-B with test pilot Phil Johnson. Also had a good visit with Stan Hiller and took a tour around the bustling and expanding Hiller shops. The things they can do with helicopters these days is out of this world.

Anybody for cheese?

I'm the perennial hard luck guy on an airplane. It happens that I don't like cheese. Last fall on a Northeast Airlines DC-3, I was in the front seat. The stewardess began serving a plate of ham and cheese sandwiches from the rear. I got the last plate, with three cheese sandwiches and no ham. Obviously, some bird back of me had pawned off his cheese for ham and the stewardess let him get by with it. So I starved until I got to LaGuardia. Not long after that I was on Pan American from Miami to El Salvador and this time I was in the last seat, but the serving began up front. You've guessed it—the meat ran out and I was offered cheese—or nothing. So I not only missed the snack but the ground personnel at El Salvador forgot to advise through passengers to eat on the ground (they kept saying "another ten minutes" until an hour went by) so it was after 3 in the afternoon before I got some lunch in Guatemala. Watch that cheese, you birds in passenger service! As far as I'm concerned you can keep all of it off the airplanes and put on some meat.

Hats off to Central Airlines for its novel DC-3 interiors. Murals, a system map (how these airlines fall down on maps!), plastic-type headrests on the seats, colorful window curtains (who in the world picks out those goshawful dull curtains in most interiors?), and a nice effect throughout. Not only colorful, but sells the airline and the area as well.

Here's a poser. Drennen Albrecht who runs Memphis Municipal Airport recalls that when the terminal was opened the key to the main door was presented to him very formally. But the door has never been locked since. It's a good bet that every airport terminal ever built is complete with locks, but when would anybody ever lock up a terminal?

ADVERTISERS' INDEX

Airlines Vote to End Reconfirmation Rule By Vote of 17 to 10

DOMESTIC AIRLINES have voted 21 to 10 to kill the reservations reconfirmation rule, effective June 15, and American Airlines has stated its intention to push for adoption of a no-show penalty system on first-class flights.

The rule, in effect since July 1, 1952, was dropped after a mail vote conducted by the Air Traffic Conference at American's request. Actual vote was 17 to 10, with four abstentions which are counted as affirmative. Sixteen of 31 votes were needed.

Effect is to leave each line free to continue or drop the rule at its own discretion. Those planning to drop it must obtain Civil Aeronautics Board approval of a tariff revision. Industry sources have predicted that some lines may keep the rule.

A partial count of trunklines showed AA, United, Western and Braniff favoring rescission, with TWA, Eastern, National, Delta-C&S, Capital and Northwest opposing it.

Under the rule, a passenger must reconfirm if he holds a reservation at a city on a flight leaving 12 hours or more after he is scheduled to arrive at the city. This applies to both return and continuing space. Reconfirmation must be at least six hours before departure, or the reservation is canceled.

Lauding the dropping of the "unfair" rule, C. R. Speers, AA's senior vice president-sales, said the airlines must find a "solution for the no-show problem which will not penalize the regular air traveler who normally uses his reservations. For those who neglect to use their reservations a reasonable penalty should be imposed. This we will recommend to the Air Traffic Conference at its next meeting in May."

It was learned that ATC's reservations committee, which met in February, discussed suggestions to extend the present air coach no-show penalty system (20% penalty) to first-class flights. The group felt, however, that a study of the effectiveness of the coach penalty and its applicability to first-class was needed. It has recommended that the Conference consider retaining an independent consulting firm to make a study and recommendations.

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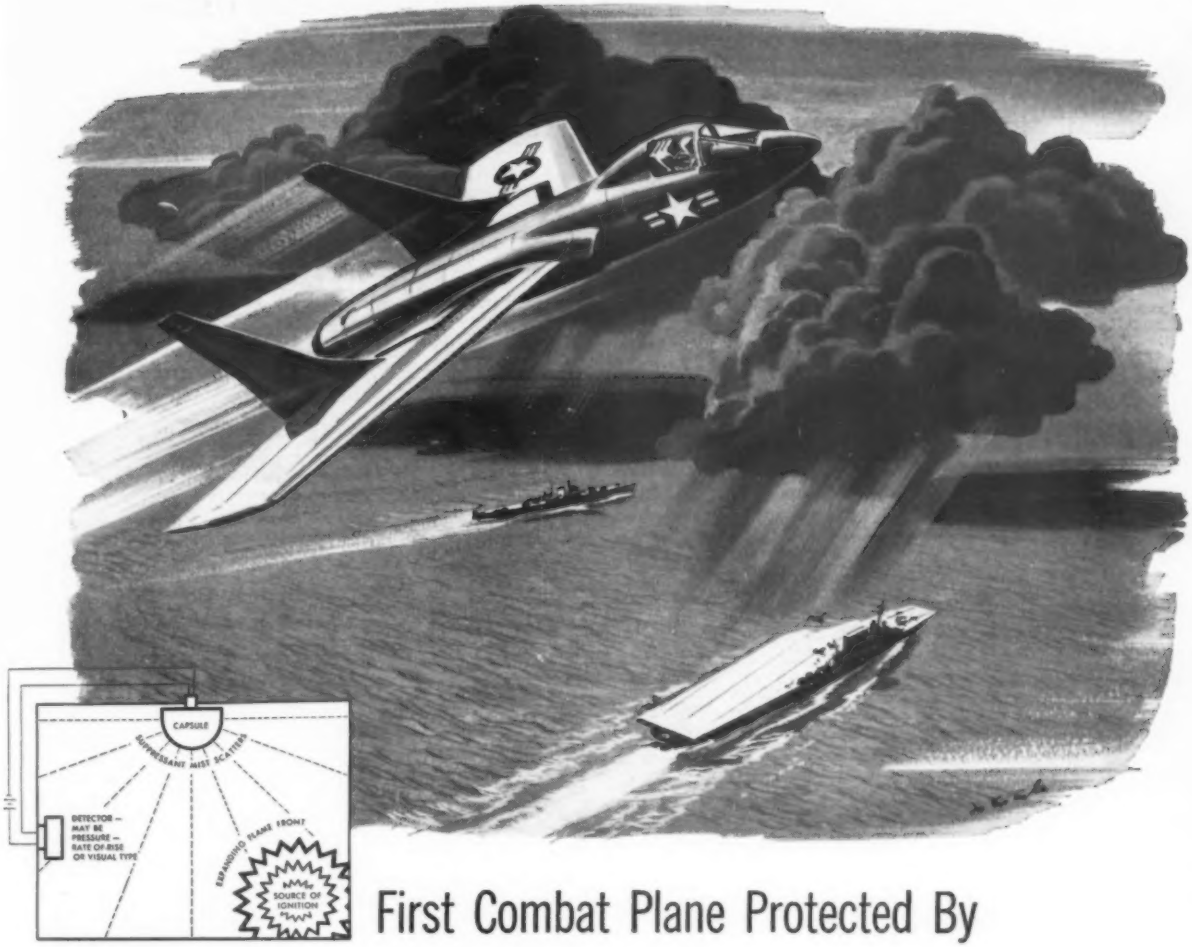

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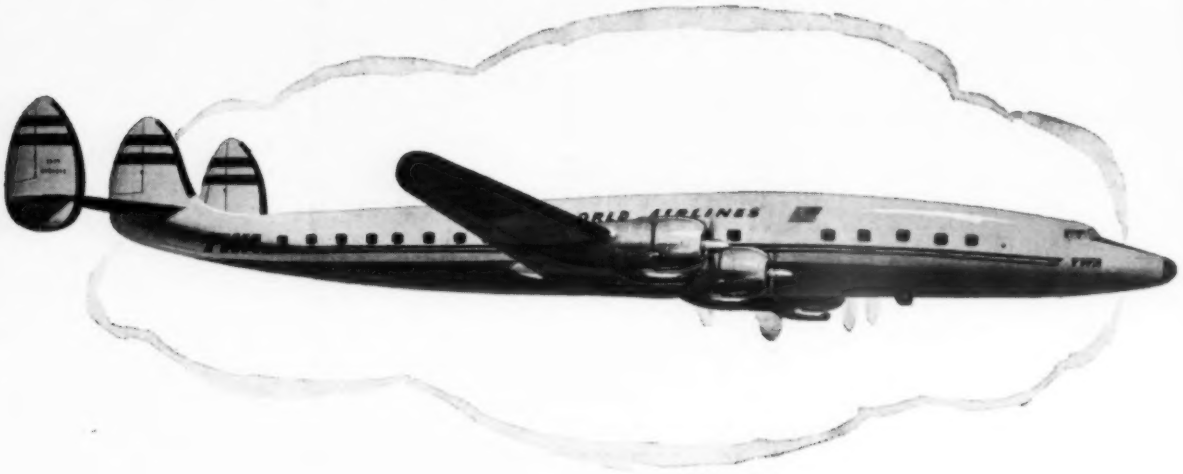

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